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A Glance at the Contents

Death of Sir Arthur Duckham.

The death has taken place of Sir Arthur Duckham, G.B.E., K.C.B., at the age of 52 years. An obituary notice appears on p. 350.

Midland Association.

The annual dinner and dance of the Midland Association of Gas Engineers and Managers, at the Grand Hotel, Birmingham, took place last week. [p. 352.]

Hot Water for the Artisan's House.

Mr. C. Harris, Engineer, Manager, and Secretary to the Taunton Gas Light and Coke Company, outlines his scheme for securing greater business in the field of water heating. [p. 364.]

Illuminating Engineering Society.

The annual dinner and dance of the Illuminating Engineering Society, which took place at the Trocadero Restaurant on Tuesday of last week, was a very bright affair. [p. 354.]

Gas Companies' Meetings.

Reports are published of the annual general meetings of the following companies: Gas Light and Coke; South Metropolitan; Commercial; South Suburban; and Croydon. In every case an increase in gas sales has been registered, in spite of general depression in 1931 and the mild weather of the latter months of the year. [p. 371 *et seq.*]

Exhausting and Governing.

Our report is published of the discussion on the paper by Mr. Roy Summerson (see last week's "JOURNAL") before the London and Southern District Junior Gas Association. [p. 369.]

Mechanized Service Cleaner.

In an account of recent innovations in gas distribution, Mr. J. B. Watt, of Adelaide, describes a mechanized service cleaner consisting of a light car fitted with an air-cooled compressor and the necessary auxiliary equipment. Great savings have accrued through its use. [p. 367.]

The Melchett Lecture and Presentation of Medal.

The Melchett Medal for the year 1931 (the second to be awarded) of the Institute of Fuel was presented on Monday, Feb. 1, to Prof. W. A. Bone, F.R.S. (Head of the Department of Fuel Technology at the Imperial College of Science), who subsequently delivered a lecture entitled "A Century of Fuel Economy." A dinner in honour of Prof. Bone was held the same evening. [p. 366.]

Spiral Gasholders.

Continued to-day is the treatise by Mr. S. M. Milbourne investigating from a mathematical standpoint, as far as possible, the main loads and stresses induced in the various members which constitute the spiral guided gasholder. The determination of the actual sections required safely to withstand these loads is then a matter of arithmetical computation and practical experience in design. [p. 359.]

Forthcoming Engagements

Feb. 18.—SOCIETY OF BRITISH GAS INDUSTRIES.—Council Meeting in the afternoon.

Feb. 19.—LONDON AND SOUTHERN DISTRICT JUNIOR ASSOCIATION.—Meeting in London. Paper by Mr. J. H. Escreet.

Feb. 19.—INSTITUTION OF CHEMICAL ENGINEERS.—Annual meeting in London. Dinner at the Hotel Victoria, 7 for 7.30 p.m.

Feb. 20.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Visit to Bingley. Paper by Mr. G. A. Winfield.

Feb. 23.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at 2.30 p.m., 28, Grosvenor Gardens, S.W. 1.

Feb. 25.—JOINT JUNIOR GAS ASSOCIATIONS.—Visit to British Industries Fair, Birmingham.

Feb. 26.—JOINT GAS SALESMEN'S CIRCLES.—Visit to British Industries Fair, Birmingham.

March 1-3.—Joint Conference of the Society of British Gas Industries, British Commercial Gas Association, Institution of Gas Engineers, and National Gas Council, British Industries Fair, Birmingham.

March 2.—LONDON AND SOUTHERN DISTRICT JUNIOR ASSOCIATION.—Visit to Gothic Works of Messrs. Thomas Glover & Co., Ltd.

March 5.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Visit to Fife Coal Company's Brownhill Colliery, Cardenden. Address by Mr. H. Rule.

March 5.—SCOTTISH JUNIOR ASSOCIATION (WESTERN DISTRICT).—Annual Business Meeting. Address by Mr. W. R. Cone, of the British Road Tar Association.

March 9.—Joint Visit of MANCHESTER AND YORKSHIRE JUNIOR ASSOCIATIONS to Messrs. W. & B. Cowan's Victory Works, Stretford. Address by Mr. E. Butterworth.

March 10.—MIDLAND ASSOCIATION.—Annual Meeting, Grand Hotel, Birmingham.

March 10.—MIDLAND JUNIOR ASSOCIATION.—Paper by Dr. F. S. Sinnatt, "A Consideration of the Properties of Coal Seams."

March 12.—WESTERN JUNIOR ASSOCIATION.—Meeting at Bristol. Paper by Mr. J. H. Bingham on "Dry Gas Meter Design."

March 15.—MANCHESTER DISTRICT ASSOCIATION.—Annual Meeting.

March 16.—MIDLAND JUNIOR ASSOCIATION.—Visit to Watson House, London.

March 18.—SOUTHERN ASSOCIATION. — General Meeting, Hotel Metropole, Northumberland Avenue, W.C., at 2.30 p.m.

March 18.—LONDON AND SOUTHERN DISTRICT JUNIOR ASSOCIATION.—Lecture by Dr. R. Lessing, "Coal Constitution and Blending."

March 19.—SCOTTISH JUNIOR ASSOCIATION (WESTERN DISTRICT).—Visit to Coltness Iron Company's Cement Works, Newmains.

March 24.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting.

April 8.—NORTH BRITISH ASSOCIATION.—Spring Meeting, Edinburgh.

May 10.—NATIONAL GAS COUNCIL.—Annual General Meeting.

EDITORIAL NOTES

Co-operation at the Fair

THE British Industries Fair is something more than a trade exhibition. It stands also for an ideal. Born during the difficult years of the war, it affords a lasting memorial to the courage and resource shown by Britain at one of the most desperate epochs in her history. In the period before the war we had been lulled into a false sense of security in our pre-eminence in trade, and the outbreak of hostilities found the country wholly dependent on foreign sources of supply for many essential commodities. The need was urgent, but the commercial section of the community showed that there was no lack of a national spirit in its ranks. While technical experts devoted themselves to the research necessary to produce dyes and explosives, individual firms busied themselves with the problem of manufacturing other goods necessary to the well-being of the country.

It was at this time that the British Industries Fair, sponsored by the Government, came into being. The original motive for its inception was the need to give assistance and encouragement to the manufacturers of Great Britain in their efforts to make the country independent of supplies from abroad. But the beginnings of the Fair have been almost lost sight of in its development. When it is remembered that the early exhibitions were held in the Victoria and Albert Museum, it can be seen how great an advance has taken place between the Fair of 1916 and that of 1932, with its immense exhibition areas at London and Birmingham.

But it is important not to lose sight of that ideal at this moment when world-wide depression, allied with industrial competition from other countries, is threatening the commercial life of Britain. The courage and determination displayed in the war are equally needed now. If we are to retain our position in the markets of the world and to increase our home trade, every effort towards efficiency of manufacture and improved methods of salesmanship is necessary. The British Industries Fair, therefore, has this year an added value. It serves to advertise British goods, to demonstrate the advances that have been made in manufacture, and to indicate the lines on which developments are proceeding. It is of equal importance in showing manufacturers what is being done in other industries than their own, in bringing them in direct contact with buyers, and in displaying the high standard of British salesmanship and business methods.

The Gas Industry has proved that it is fully alive to the needs of this difficult time. As at last year's Fair, it has approached the exhibition in a spirit of co-operation and national unity. Under the direction of an Organizing Committee, the Industry is represented by a combined display designed to show the services of gas to every section of the community. Over a century has elapsed since the first crude attempts at lighting by gas were made. To-day there is scarcely a person from Land's End to John o' Groats who is not dependent on gas in some form or other.

The Gas Industries Section

THE Gas Industries Section at Castle Bromwich, therefore, has been carefully planned to appeal to the public as a whole—to every trade and every class of person. Buyers of gas-works plant and manufacturers will have the opportunity of appreciating the extraordinary advances that have generally been made in the last year. They will be able to examine and handle new apparatus, and will find convincing evidence that in the production of plant and equipment our manufacturers are determined that Britain shall still lead the world. Lighting engineers and the representatives of local authorities will see the latest developments in gas public lighting equipment. Architects, builders, and the general public will find plenty to interest them in the numerous and varied domestic appliances on view.

The national organizations and the sixty or more manufacturers who have co-operated in the Section have put forward their concerted efforts to get together an exhibition which will serve as an object-lesson to the many thousands who will visit the Fair. It only remains for the Industry itself to show its appreciation of the work done on its behalf. It is the duty of those in authority to uphold the prestige of the Industry by giving their whole-hearted support to the Section. Every member of the Industry, from the rawest recruit to the administrative heads of our largest undertakings, would learn something from a visit to Castle Bromwich. The display does not merely illustrate the use of gas in industry, but the service of the Gas Industry in the whole national economy.

Thus it is important that heads of departments not only should spend some time at the Section themselves, but should, if possible, arrange for at least a proportion of their staffs to do likewise. The British Industries Fair is the most opportune occasion in the year for the technical experts in the Gas Industry to meet and exchange views, and to take note of the latest developments in methods of production. Visitors from one part of the country can see how economies are being effected and problems are being solved in other districts. To the salesman it is a unique opportunity to gather a wider knowledge of his job, and to learn something of the activities of the Industry outside his own immediate sphere. No one can come away feeling that time and money have been wasted.

The co-ordination which has made the Gas Industries Section possible and the gas appliances exhibited are a national advertisement for the Industry. That advertisement will fall short of its full effect unless it is supported by the united efforts of the whole Industry. By their presence gas engineers, salesmen, and technicians will be assisting at the progress of the Industry to which they belong, and which it is their pleasure and duty to serve.

A Strong Position

THE reviews which appeared in last week's issue of the "JOURNAL" of the Metropolitan Gas Companies' Reports and Accounts for the year 1931, will have prepared readers for encouraging statements at the annual meetings which are fully reported on later pages of this issue. As Sir David Milne-Watson (the Governor) said, when presiding over the meeting of the Gas Light and Coke Company, the increase in the sale of gas of almost 1½ p.ct. recorded by that undertaking is, in view of the conditions prevailing to-day, most satisfactory. With a total income from gas and rentals which has now passed the £10,000,000 mark, the statistics involved are naturally colossal. During the year there was an increase of no less than 27,000 in the number of consumers, which now approaches 1,400,000, and in the same period there were supplied a further 86,000 pieces of gas apparatus.

The Company have been active in extending their sphere of operations, recent years having witnessed a series of amalgamations. The latest of these was the taking over of the Southend-on-Sea and Brentwood Gas Companies, and the Company are this year introducing a Bill into Parliament to further extend their area of supply so as to include Canvey Island. The result of

the amalgamations that have been brought about is that the Company now supply an area well over 500 square miles in extent. They have 15 manufacturing stations and 51 showrooms. There are over 4970 miles of mains in their enlarged district, and they supply gas to 49,000 public lamps. The Company consume no less than $2\frac{3}{4}$ million tons of coal annually, and over 17 million gallons of oil; and they possess a fleet of 17 steamers. These figures were quoted by the Governor to show how vast an organization is the Gas Light and Coke Company.

The references made to the new fuel which the Company have recently put upon the market—and to which the expressive name of "Cleanglow" has been given—were interesting, and were followed by the statement that at Richmond the low-temperature plant has been closed-down, as it proved to be a commercial failure, and the Company were losing money by working it. "Cleanglow" is a specially prepared fuel suitable for burning in open fireplaces. The enthusiastic manner in which it has been taken up in London leads the Company to think that there is a great future for this new fuel among the many householders who desire to have at least one open fire in their homes. The provision of a gas attachment to ignite the fuel adds, of course, to the attractiveness of a fire of this character from the housewife's point of view. It will also be noted that during the year the Company have produced no less than $2\frac{3}{4}$ million gallons of benzole, and that they are taking steps at the present time to increase the output to something between 5 and 6 million gallons. Though it has not yet been formally opened, the new coke oven plant at Beckton has started work, and promises to be a very useful adjunct to the Company's manufacturing capacity.

The Committee appointed early last year by the Board of Trade to consider what alterations were required in gas legislation, of which Committee Sir David Milne-Watson is a member, have held many meetings and made certain progress. The Industry as a whole will earnestly echo the Governor's hope that after this Committee have reported, Parliamentary time will be found to put the recommendations into effect—especially as they will be largely based on those made long ago by various Government Committees, notably the National Fuel and Power Committee. There is great need for such amending legislation, and now that the encouragement of home industries is receiving special attention it would be doubly unfair if the Gas Industry were left out in the cold. It should be recognized by those in authority that the Gas Industry will be able to most help other industries if free to do so in the manner which may seem best to it. As the Governor remarked, "if Parliament takes the responsibility of acting as if they were a superior Board of Directors, they must realize that time must be found to alter these statutory enactments. . . . What would be said of a Board of Directors who gave as an excuse for not adopting the latest business methods that they could find no time to do so? This is exactly what is happening in Parliament." There are the very best of reasons for admitting the truth of his contention that "it would seem that we as a country are spending too much on being governed," and this being so there must be the less justification for any shortcomings in the governing.

Increasing in Strength

THERE also fell to be reported an increase in the number of consumers, and a gain of rather more than $\frac{3}{4}$ p.ct. in the output of gas, by the South Metropolitan Gas Company. In stating these facts to the proprietors, the President (Dr. Charles Carpenter) asked them to remember, when considering the position of the undertaking, that one might increase in strength as well as in size, and he assured them that evidence of such increase existed. On this occasion it was possible to record a welcome change of attitude on the part of the authorities, in the matter of restrictions placed upon the tenants of municipal houses with regard to the taking by them of a supply of gas. This is a subject upon which Dr. Carpenter had a good deal to say a year ago; but, of course, there have been important happenings in the meantime. We should like to see the Gas Industry as a whole guaranteed freedom in this respect, just as we should like to see it freed from the legislative restrictions which at the present time hamper it in its efforts to provide the best possible service for the community. The progress through Parliament of the Bill of the Kettering Gas Company, which contains a clause to prevent them being deprived of business in Council Houses, will be carefully watched.

And while some Councils are standing in the way of gas companies in this manner, there are authorities who use imported bitumen on the roads. Will they supply an answer to the President's query: "Why import foreign bitumen if all that is needed in the way of road binding and surfacing material can be provided by specially prepared coal tar?" Another equally pertinent question put by him was: "Why import foreign oil when British coke made from British coal, raised by British labour, would provide all the heat your offices need for their central heating?" It should not be too much to anticipate that a year hence there will be less justification for asking such questions as these than unfortunately exists to-day. "Buy British" could hardly be urged with greater appropriateness in connection with any industry than in the case of the great employment-giving coal producing and utilizing industries.

Turning to the operations of the Company during the past year, the President quite rightly emphasized the lowness of the figure for unaccounted-for gas, which is again below 1 p.ct. of that distributed, in spite of the facts that pressure requirements tend to increase rather than decrease, and that the sub-soil of the roads is being more and more occupied for purposes other than sewers and gas and water supplies. About a twelvemonth ago the Company started-up their low-temperature plant for the production of "Metro-Coalite," but being somewhat dissatisfied with the quality of the product, the plant was shut-down for the summer months. Early in the autumn it was once more put to work, and since then has been turning out a fuel of good quality, the demand for which is an improving one. The market must, however, expand further before there is need to run the plant at anything approaching capacity, and as in these circumstances it is impossible to be sure of the works costs, Dr. Carpenter preferred to defer a fuller account of the progress of this branch of the business until some future occasion. In the matter of the gas fire, the President was able to assure the proprietors that the Company have not stood still, but have carried out a good deal of work in studying the manner in which heat is transferred through the skin as well as through other materials. While for heating an ordinary room the gas fire is the most efficient and effective machine, he is not quite sure whether its application could not be improved upon. Under a patent which they took out in 1927, the Company have been experimenting in the construction of gas fires which will emit short infra-red rays when a room is to be heated, but which can be adjusted when people enter the room to give to these red rays a luminous effect. "To what extent the fire is more health-giving than those we are at present supplying is," the President added, "a highly contentious matter, upon which it is exceedingly difficult to obtain satisfying scientific evidence."

Changes which time has wrought in the character of the consumption of gas through prepayment meters have induced the Company to include in a Bill now being promoted a clause dealing with prepayment meter charges. Since its first adoption, there has been an extraordinary extension of this method of supplying gas. On the one hand, the Company have slot meter consumers whose gas consumption is very small, and on the other hand there are many slot meter consumers using comparatively large quantities of gas. The latter consumers are consequently paying a rental in excess of what should be necessary to meet the fittings charges, because they continue to pay after the hire of the installations has been met. When this rental has been recovered, they should, it is felt, be relieved from further payment in this respect, and obtain their gas at the ordinary price. To enable this to be done, however, it is necessary to increase the maximum addition which the slot meter consumers pay, and the increased charge

will be made on gas consumed up to a certain quantity. Beyond this consumption, they will pay only for gas, and not for gas *plus* rental charges. Therefore, the Company are asking for authority to raise the charge from $1\frac{3}{4}$d. to a maximum of 3d. per therm.

Prepayment and Ordinary Consumers

For the reasons above set out, the Commercial Gas Company, in a Bill they are promoting, also propose to raise the maximum chargeable to prepayment consumers—in this case from 2d. to 3d. per therm. The accounts of this Company, too, showed that there had been a small increase in the sales of gas over the previous year. It was explained by Dr. Charles Carpenter, when presiding at the meeting, that a systematic inspection of appliances is being undertaken, and that the overhaul of lighting fittings is being followed up by a system of maintenance. "During the two years this scheme has been in vogue," he said, "we have sold the almost incredible number of 100,000 lighting burners. We may assume that if people bought them they did not do so for decorative purposes, but for the purpose of getting light. At the same time, we have exchanged 48,000 pendants and brackets, so that I think these figures, contrary to the feeling in some quarters that gas lighting is a thing of the past, should convince you not only that it is not a thing of the past, but is to-day still very much alive."

The outstanding matter discussed at the annual meeting of the South Suburban Gas Company was the Bill which is being promoted for the purchase of the Sevenoaks and Tonbridge Gas Companies; but in his speech from the chair Dr. Carpenter had other interesting points to make. One of these was with regard to the increase in the sale of gas (amounting to about $5\frac{1}{2}$ p.ct.) for the year under review. Unfortunately, consequent upon climatic conditions, the increase over the twelve months was so irregular as not to be conducive to the best monetary results, but it presented also another feature, in that it was largely due to the ordinary consumers. To be precise, the consumption of gas by ordinary meter increased by 8 p.ct., whereas the growth in prepayment consumption was but slightly over 2 p.ct. Again, the number of prepayment supplies has been almost stationary, while the great increase has been in ordinary consumers. What is the reason for this? No doubt the Chairman is correct in saying that it may possibly be attributable in part to the quality of the houses now being built, but that it may also be due to the fact that the Company have in operation a system of monthly collection of accounts.

Presiding at the meeting of the Croydon Gas Company, Mr. William Cash dealt with a number of interesting points in placing a gratifying position before the shareholders. The public lighting figures are distinctly satisfactory, and the same remark applies to the showrooms. Estimates which have been got out demonstrate that, after allowing all reasonable expenses and charging them with an estimated rent and interest for the use of the materials employed there and all the direct expenses, there is quite a reasonable profit on the business done. During the year, largely from the showrooms, the Company put in very nearly 10,000 additional appliances. A system of continuous meter reading throughout the year has been adopted by the Company. Instead of the work of meter reading being crammed into the end of the quarters with a great rush and strain on the staff, it goes on throughout the whole year at regular quarterly intervals, but not necessarily on quarter day.

CORRESPONDENCE

The Dry Gas Meter—Suggestions on Policy

SIR,—The letter published in the "JOURNAL" of the 10th inst., from Mr. William Templeton, of Leeds, directs attention again to the desirability of devising a scheme for the adoption of a minimum number of capacity sizes for gas meters.

The consideration of this problem by those concerned is long overdue. In July, 1928, at a meeting of the Association of Statutory Meter Inspectors held at Stratford-on-Avon, I suggested the time had arrived when the representatives of the manufacturers, purchasers, and the Statutory Inspectors of Gas Meters should jointly consider steps for reducing the numbers of meters of varying capacities and arrive at some method of designating the meters more in accord with modern requirements of the Industry, than was now indicated by light, standard, and high-capacity badging. Such a scheme of rationalization would prove beneficial to all concerned for the reasons which have been pointed out on several occasions and which are reiterated in Mr. Templeton's letter.

I trust, therefore, the Gas Meter Committee of the Institution of Gas Engineers will give this subject their early consideration with a view to calling a conference of the various interests involved in order that the problem in all its aspects may be fully discussed.

R. J. ROGERS,
Chief Superintendent,
Fittings Department.

Gas Department, Council House,
Birmingham,
Feb. 16, 1932.

SIR,—We have read with interest Mr. Templeton's letter on the subject of dry gas meters. The policy he suggests is almost identical to that advocated by us in a paper read recently before the Yorkshire Junior Gas Association by our Mr. Bingham, and reported in your issue of Dec. 23 last.

In this paper was stressed the need for a reduction in the large number of sizes of meters at present in use, and also for a revision of the existing bases of rating.

It is unfortunate that a subsequent paper read by Mr. Bingham to the South Wales and Monmouthshire Gas Salesmen's Circle has not yet appeared in the Press. On this occasion it was recommended that the three parties interested in the gas meter—namely, the maker, the user, and the Board of Trade—should give immediate and concerted attention to the subject of gas meters.

Before consideration can be given to the second, and in particular to the third, of Mr. Templeton's proposals, it is essential that the statutory requirements of the Board of Trade should be revised.

The regulations prescribed for the testing and verification of meters do not in themselves provide a well-defined basis for classification and rating. No discrimination is made between the use of gas or air for testing purposes, although there is a marked difference in the behaviour of a meter when one or other of the two media is employed.

Attention has not been called to this fundamental by way of criticism. We quote it merely as one of the many questions which should come up for review. The position is decidedly complex. The longer it is allowed to exist, the more involved it will become.

Any movement initiated aiming at standardization and the elimination of superfluous types will receive our wholehearted support.

C. G. LANGFORD,
General Manager,
George Glover & Co., Ltd.

Ranelagh Works,
Chelsea, S.W. 3,
Feb. 15, 1932.

SIR,—It is with interest one reads Mr. Templeton's letter in your issue of Feb. 10, but it is regrettable that your correspondent has seen fit to praise a paper read by Mr. Preston, of Adelaide. Personally I can find nothing new in the paper, when for the past ten years we have had many excellent papers on meter questions by various members of the Gas Industry, and the prominent technical and practical expert Mr. A. T. Gilbert, Assoc.Inst.Gas E., on "Gas Meter Design" has lectured throughout this country

to the members of the fitting staffs of various Gas Undertakings.

I do not wish to enlarge upon the services rendered by Mr. Gilbert to the Gas Industry, but I certainly wish that Mr. Templeton had taken notice of various reports of lectures and technical articles published in the Gas Press from this gentleman. It may also have struck your correspondent that, whereas Mr. Preston's paper was read before the Australian Gas Institute, most of the lectures given by Mr. Gilbert have been delivered to the employees of gas undertakings, mostly fitters, collectors, and maintenance staff, and that his lectures, I understand, number over 50 and the attendance well over 2000. There is here ample proof that the minds of Gas Engineers are not all dormant as to the excellent information that can be given to the members of their staff on the design and peculiar eccentricities of wet and dry gas meters. In passing I should like to add that wet meters are also included in Mr. Gilbert's syllabus, but, as mentioned by Mr. Templeton, these are now obsolescent in this country.

With regard to Mr. Preston's " opinions " on the lack of engineering design, I should like to point out that many attempts have been made to improve meters on so-called engineering lines, but the old construction and design as inaugurated by Clegg, Crosley, Speckston, and Defries still survive, and what is more they are preferred by the buyers in this country. Also oil filming is not new to the adherents to the wet meter.

With reference to Mr. Templeton's proposals regarding standardization of meter capacities one would certainly like to agree with him, and the writer feels sure that the maximum capacity as allowed at present could most certainly be put up to a much higher rate and eliminate many of the present existing redundant case dimensions (but different capacities). We could rate our meters commencing at 50 c.ft. per hour (these being for gas fires), 100 c.ft., 200 c.ft. per hour, and so on. The advantages of this in the writer's opinion should have been apparent to the " powers that be " ages ago.

Here again Mr. Gilbert has been pressing the Institution of Gas Engineers, in conjunction with other prominent gas engineers, for an improved system of rating meter capacities. His remarks at the Annual Meeting of the Institution of Gas Engineers, 1931, on the rating of meters at 100 c.ft. and 200 c.ft. per hour are in themselves proof that this question has been well kept to the fore.

J. PHILLIPS.

76, *Mortimer Road,*
Kingsland, N. 1,
Feb. 15, 1932.

SIR,—It was with great interest and subsequent reflection that I read Mr. Templeton's letter in the " JOURNAL " of the 10th inst. To my mind, the latter part of the letter contained one or two points which do not appear to be in accordance with theories and suggestions put forward by prominent men in this section of the Gas Industry.

To this date I have always believed, in common with many other users of gas meters, that the primary consideration is accuracy in recording the quantity of gas passed. Secondly comes the time that the meter will continue to fulfil this obligation. The question of pressure loss is then an important consideration, but always after the former desiderata are satisfied.

The suggestion that one of the smaller meters of the latest type will pass 200 p.ct. above its badged capacity, at a pressure loss of 5 tenths, will probably be queried by many. The particular query will be in the case of a slot meter which predominates in these sizes, and has the usual condition met with in service—viz., of the prepayment valve being open for one coin or less. Apart from this, the revolutions of the meter will be increased from 400 revolutions per hour to 1200, in the case of one common size in use; and this seems to be the point where a question of policy arises.

It has been my privilege to examine the interior of a dry gas meter and also to watch a glass-cased meter work. I then arrived at the following conclusions:

(*a*) That a meter working three times as fast will become inaccurate at least three times as quickly, if not sooner. This will be due to the tendency of some of the bearings to develop slackness owing to a minute jump at the ends of the stroke, which will, in time, make an oval bearing.

(*b*) That this slackness would affect the timing of the slide valves and consequently affect the accurate registration.

(*c*) That those authorities who have preached the theory of the maximum load badge being a definite guide, without any " percentage overloading," were men with the thought in their minds of the annoyance to consumers when changing meters, with this cost and unaccounted-for gas added later.

The first two recommendations in Mr. Templeton's letter are sound if the question of cost does not become excessive. The third recommendation appears to go against the idea of ultimate economy, and might develop into a scramble by the meter makers to produce a " Pendine Sands " model, useful only to the man with a stop watch.

" TEMPUS."

Feb. 15, 1932.

SIR,—The Chief Inspector of the Gas Meter Testing Station at Leeds, in his letter in the " JOURNAL " for Feb. 8, referring to the paper read by Mr. S. R. Preston, of Adelaide, before the Australian Gas Institute, writes: " I should like to express my congratulations on a paper bearing upon a subject which, despite its profound effect upon the finances of the Gas Industry, figures so little in the minds and activities of gas engineers in this country."

It would appear that the writer may not be aware of the far-reaching work which was done by the Life of Gas Meters Committee of the Institution of Gas Engineers. In it Mr. B. R. Parkinson took a very prominent and helpful part. His work was eventually recognized by the Council of the Institution, on whose nomination he was elected to Honorary Membership at the meeting in Belfast in the year 1923.

If Mr. Templeton and others interested in this important matter will refer to the Transactions of the Institution year by year from 1916 they will realize the value of the work which the Joint Research Committee established by the Institution and the Society of British Gas Industries accomplished. Their preliminary report is given on page 153 *et seq.* of the Transactions for 1916. It included, *inter alia*, the report by Dr. Lessing of the work carried out under the auspices of the Joint Committee during the previous Institution year, the terms of reference being to deal in the progress of the investigation with the following:

1. Effects of position of meters when in use.
2. Liquids in meters.
3. Action of gas upon meters.
4. Decay of leather.
5. Internal corrosion.
6. Deposit on valve-faces.
7. Naphthalene in meters.
8. In a given time, is more work being put on meters than heretofore?

Dr. Lessing stated that a trip to the United States which he had occasion to undertake early in 1916 gave him the opportunity of getting into touch with American engineers and manufacturers, and obtaining some valuable information on their experiences. His work for the Joint Committee was mainly intended to clear the ground, and to indicate the lines along which future research should proceed. His report concluded: " In view of the large amount of capital locked up in gas meters, the results, as far as they go, seem to warrant that closest attention should be given by gas undertakings to their care and to the causes making for their destruction."

In the Transactions for 1920-21 the Joint Committee's Report was sectionalized as follows: (1) The continued investigation into chemical and physical causes of internal corrosion; (2) Report on the lubrication of meters by spraying, and the effect on meters of introducing oil vapours into the mains; (3) Comparison of notes with a similar Committee of the American Gas Association; (4) The work of the Committee in reference to the amendment of the Sales of Gas Act; (5) The tabulation of new standard sizes of meters with revised denomination.

The attention of Mr. Templeton should be particularly directed to the last section, for he seems to be under the impression that the denomination of meters by hourly capacity has not been considered. He will see on p. 683 the list of Approved New Standard Sizes of Dry Meters which came into operation on Jan. 1, 1922. They are numbered from 1 to 12, the capacity per hour varying from 30 c.ft. in the first number to 3000 c.ft. for the latter number. The revolutions per hour, capacity per hour and per revolution, and bore of connections are all specified for each number of meter. The Joint Committee pointed out in their report that in these new figures the smaller dry meters had been speeded up a little in accordance with improved methods of manufacture, but only the capacity per hour, the number of cycles or revolutions of the meter, and the size of unions, figured in the standardization; the dimensions of the meter were not defined.

WALTER T. DUNN.

72, *Elphinstone Road,*
Hastings.
Feb. 12, 1932.

OBITUARY

Sir Arthur Duckham, G.B.E., K.C.B.

By the death of Sir Arthur McDougall Duckham, at the early age of 52, the country has lost a valued son, and the Gas Industry a warm friend and staunch advocate. To his creative genius and unbounded energy the Industry owes a debt which it can pay, in part only, by emulating his quality of mind. Arthur Duckham was an optimist; in presence of his commanding, cheerful, sympathetic personality there was no place for gloom, but ample room for endeavour. His breadth of vision and his forcefulness dispelled gloom; he was always ready to tackle problems which left the ordinary man in a state of indecision, and because he knew men his advice and suggestion, springing from rare fecundity of idea, found quick expression in the work of others. Sir Arthur was a leader of men by example. His capacity for work was infectious, and his appreciation, told both privately and publicly, of the work of others, made him a well-loved Chief.

There will be a gap in the social life of the Gas Industry, for no man in similar circumstances could have been more willing to give of his time than Sir Arthur. He was fond of excusing his kindheartedness by saying that his reason for supporting the Gas Industry was because he lived by it —a statement which by no means gives a true picture of his affections for the Industry, for even a life's work devoted to any profession does not always result in the regard in which Sir Arthur was held by the Gas Industry. He was always welcome because he was large-hearted. In a word, Arthur Duckham lived fully, and he has added peculiar lustre to the tradition of the Industry. The Industry's aim is service, and this was surely the aim of Sir Arthur Duckham.

His death took place suddenly on Sunday last at his home, High Warren, Ashtead, Surrey.

For the following particulars of Sir Arthur's life we are indebted to "The Times," who published a sympathetic obituary notice in their issue of Monday last.

The son of Mr. F. E. Duckham, M.Inst.C.E., of Blackheath, he was born in 1879 and educated at Blackheath proprietary school. He served his apprenticeship in engineering workshops under Sir George Livesey, and decided to specialize in furnace work and coal carbonization, believing that fuel and its economic use is the basis of industry. At that time the Gas Industry was not highly developed, and Duckham spent his evenings in study at King's College, London. His first post was as Assistant Engineer to the Bournemouth Gas and Water Company, under Col. Woodall, with whom he invented and patented a method for the continuous carbonization of coal. He resigned his post, and with a small capital which he borrowed he set to work to convince the Gas Industry that the invention was sound.

It was a hard struggle to develop what became known as the Woodall-Duckham Companies, involving much dangerous experiment in high temperatures and many disappointments. But after about six years' perseverance success came, more inventions were patented, and his name became known in the Industry for efficiency in works construction. At his death he was Chairman of Woodall-Duckham (1920), Woodall-Duckham Vertical Retort and Oven Construction Company (1920), British Furnaces, Peco, Ltd., Stourbridge Refractories Company, and the Thermal Industrial and Chemical (T.I.C.) Research Company. He was also a Director of Alexander Duckham & Co., British Benzole and Coal Distillation, British Magnesite Calcining Company, and the Leatherhead Gas and Lighting Company.

During the war Sir Arthur Duckham—he was made K.C.B. in 1917 and G.B.E. in 1929—was Deputy Director-General of Munitions Supply, and subsequently Chairman of the Advisory Committee of the Ministry of Munitions; also Director-General of Aircraft Production and a member of the Aircraft Council, 1918-19. In August, 1928, at the request of Mr. Bruce, then Prime Minister of Australia, the Home Government appointed a small Commission comprising Sir Hugo Hirst, Sir Ernest Clark, and Mr. D. O. Malcolm, with Sir Arthur Duckham as chief, to advise on trade opportunities in Australia. They spent seven months in the Commonwealth, and returned with a strong belief in the need of closer co-operation with Australia and other parts of the Empire. It was not a question of the best bargain that any individual part might make, but a question of what was best for the whole.

In 1929 Duckham was appointed one of the representatives of other industries on the Coal Commission presided over by Lord (then Mr. Justice) Sankey, and submitted a report, signed only by himself. In it he agreed with the chairman in favouring the State ownership of mineral rights, but was against the national ownership of mines. The nationalization of the coal mining industry would be an unprecedented and colossal experiment. A mistake would result in a national calamity. All mineral rights should be acquired by the State and controlled by a Minister of Mines. He put forward a scheme of his own for the amalgamation of colliery interests in the several districts in the form of statutory companies.

A little more than a year ago Sir Arthur Duckham was elected Deputy President of the Federation of British Industries with a view to his becoming President in 1932. He was already Chairman of the Standing Committee on Mineral Transport. He was one of the founders of the Institution of Chemical Engineers of which he was President for two years, and was also President of the Society of British Gas Industries. He was President in 1930 of the British Export Society, and he was Chairman of the Advisory Committee set up to advise the Government on applications for assistance from public utility undertakings under Part I. of the Development (Loan Guarantees and Grants) Act, 1929. He was obliged, however, to resign this latter office in 1930 owing to the pressure of professional duties. Sir Arthur Duckham was a man of wide outlook and capacity to grasp novel and great problems. To great versatility and knowledge he added marked social qualities of geniality and good humour which made him universally

popular both at home and in his extensive travels abroad. Sir Arthur Duckham married in 1903 Maud, daughter of Mr. A. D. Peppercorn, and had with two daughters a son, whom he was educating on the most practical lines in applied mechanics.

We have received from Dr. Charles Carpenter, C.B.E., the following appreciation:

Dead is the leader of the Gas Industry, the mighty man of mind and action, who overtopped his fellows as a great oak towers above the surrounding brushwood of the forest. The Industry has not had so severe a blow since Livesey died in the sere and yellow leaf, not as Duckham in the very prime of his mental and, as one would have imagined, his physical powers. Scarcely more than a week since I was discussing with him at the self-same table where I so often faced Livesey, the theory and practice of gas-producer design, and a new scheme for recuperative heating we had tentatively agreed to join hands, or rather heads, in developing. Half in earnest I told him then that the country ought to take over and free him from the

anxieties of his business so that he in turn might devote himself to our country's interests. For he was in truth a superman, and we are as a nation starving for men of his type.

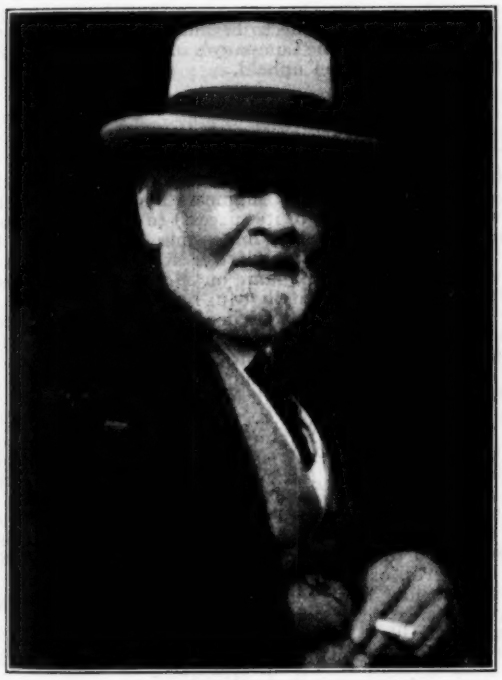
It seems a long time ago since I first met him, then an articled pupil to the late Frank Livesey, who preceded me as Chief Engineer of the Company. With his death Duckham's articles ceased to be effective, and I took over the task of completing his training and enlarging his usefulness. I need not say I have always been proud of my whilom pupil. But our relationship grew to be more than that which master and pupil might have envisaged, for our knowledge of each other grew to friendship and led through mutually trod paths to those other pleasures of music and art which light our progress through the thorny places of the world. It was characteristic of Duckham that he numbered among his friends the greatest Italian singer of the past generation, and the lives of both support the belief that those " whom the gods love die young."

We regret to announce the loss sustained by Mr. EDWARD A. HARMAN by the decease of his wife at the age of 72 years. To many of the older members of the Gas Industry Mrs. Harman will be happily remembered during her twenty years' residence in Huddersfield and for many years previously in Birmingham and West Bromwich. The funeral service was held on Jan. 25 at Hull Northern Cemetery, and was sympathetically conducted by the Rev. Canon W. Seldon Morgan, M.A., the Vicar of Holy Trinity Church, Hull. To Mr. Harman and his daughter (Miss Harman) general sympathy will be extended. Mrs. Harman was born in Lilleshall, Shropshire, and married there in 1887.

PERSONAL

FREDERIC H. LAMB.

Mr. Lamb celebrated his 80th birthday on Feb. 14. He joined the firm of Donald Macpherson & Co. 42 years ago in January, 1890, and was appointed Secretary on Jan. 16, 1895, when the Company was formed into a limited concern. On the retirement of Mr. Macpherson in November, 1901, he was elected a Director; and both these positions Mr. Lamb still holds.



In the early years Mr. Lamb travelled for the Company and called on practically all the principal gas-works in the British Isles from Inverness to Torquay, and in the Eastern Counties, and became very friendly with the members of the gas profession; and he is glad to think that he has retained many friendships among them. His brother, the late Mr. J. E. Lamb, was the Manager at Altrincham Gas-Works.

Mr. Lamb commenced his business career with the Bridgewater Navigation Company (now the Manchester Ship Canal Company) at Liverpool, and afterwards was 15 years with the old Manchester, Sheffield, and Lincolnshire Railway, in the Accountant's Office.

PRESENTATION TO SIR HENRY WADE DEACON.

At the conclusion of the Board Meeting of the Liverpool Gas Company on Jan. 27, Sir Henry Wade Deacon was presented with his portrait in oils (painted by Mr. Frank T. Copnall).

The presentation was made by Mr. T. Case Morris, on behalf of the Directors, the two surviving former Directors (Messrs. T. Case Morris and Allan H. Bright), and Mr. Robert Gladstone, a shareholders' auditor.

Mr. Alfred Tyrer, the Deputy-Chairman, referred to the Knighthood recently conferred by His Majesty upon the Chairman, and said it was thought that this was a suitable opportunity of presenting him with his portrait, to commemorate the honour which he had received, and also the esteem in which they held him and the good work which he had done for the Company.

Sir Henry, he said, was elected a Director in 1902, and had been Chairman for 27 consecutive years, during which he had controlled the affairs of the Company with signal success. During this period the number of consumers and the gas sales had increased by 101 p.ct. The number of miles of main had increased by 33 p.ct. and the capital employed by 54 p.ct. The method of coal handling had been simplified and cheapened, hours of labour had been reduced from 55½ to 47 hours per week, while the annual wages bill had increased from £48,420 to £104,044. After referring to the successful introduction of the Company's new smokeless fuel, " Dryco," the Deputy-Chairman added that the area of supply had materially increased, which had also involved greater responsibilities.

On Friday, Dec. 18, 1931, the University of Liverpool conferred upon Sir Henry Wade Deacon the honorary degree of LL.D. The ceremony was carried out in St. George's Hall, the occasion being the celebration of the fiftieth anniversary of the foundation of University College.

With the retirement of Mr. ROBERT MASON, under the age limit, as Public Lighting Superintendent of the City of Birmingham, the Association of Public Lighting Engineers loses a " foundation " member who, until recently, had been a member of the Association Council from its inception. Mr. Mason on several occasions granted facilities for meetings of the Council in his Department. He was offered the office of the Presidency some three years ago, but his approaching retirement and indifferent health caused him to refuse the honour. He has had an association of nearly 50 years with the Lighting Department of the City of Birmingham, having joined the staff as clerk in 1883. He contributed much to the efficient public lighting of his city, and to public lighting generally, by his continuous experiments with burners and lamps. On his farewell he was the recipient of a presentation from the staff and employees of the Department.

Mr. JOHN A. TINNE, of Messrs. Sandbach, Tinne, & Co., Liverpool, has accepted an invitation to join the Board of Directors of the Liverpool Gas Company, in place of the late Mr. J. Heron Eccles. In so doing, Mr. Tinne is carrying on a family tradition, as his grandfather, Mr. J. A. Tinne, was a member of the Board from 1871 to 1884, being Deputy-Chairman in 1875 and 1876, and Chairman in 1877 and 1878. Mr. J. Ernest Tinne, father of the new Director, was a Director of the Company for over thirty-seven years, from 1888 until his death in 1925, and acted as Deputy-Chairman for seventeen years, from 1901 to 1917. He was keenly interested in co-partnership, and was a member of the Co-partnership Committee, from the commencement of the scheme, for more than six years. Mr. J. A. Tinne was educated at Eton and University College, Oxford, and served with the B.E.F. in France, Belgium, and Italy. He is J.P. for the County of Chester, and represented the Wavertree Division in Parliament from 1924 until June last, when he resigned.

THE NEWS OF THE WEEK

The Dunfermline Corporation have completed an agreement with Metal Industries, Ltd., Rosyth, for a supply of not less than 50 million c.ft. over a period of five years. The Corporation will lay a pipe costing £1317, of which sum the Company will contribute £671.

The Easingwold Gas Light and Coke Company are reducing the price of gas from 5s. to 4s. 9d. per 1000 c.ft., to date from April 1, with a corresponding benefit to slot meter consumers. The annual meeting of the Company last week approved a dividend of 10 p.ct., less tax.

A Tribute was Paid at last week's meeting of Arbroath Town Council to Mr. A. C. Young, Gas Manager, who died the previous week, by the Provost, who moved that the Council record in the minutes their appreciation of Mr. Young's services and that an extract be sent to Mrs. Young. The Council unanimously agreed to do this.

Mr. James Campbell, Manager of the Dunfermline Corporation Gas-Works, gave an address on "The Gas Industry" to members of the Men's Guild of the local Co-operative Society. Mr. Campbell demonstrated that gas was far from being a back number and provided some good propaganda not only for the local undertaking but the whole Industry.

A Letter from the Buckie Gas Company asking the Town Council to consider further the question of buying the undertaking was read at the last meeting of the Buckie Town Council. "If," the letter stated, "the Council was not to consider it further the Company would hold the matter as closed. The Provost said that they had made the Company an offer and this was final. After a discussion the Council decided to take no action.

Manchester District Association of Gas Engineers.—In view of the Joint Gas Conference to be held at the British Industries Fair, Birmingham, March 1-3, it has been decided to hold the Annual Meeting of the Association of Gas Engineers on Tuesday, March 15, and not March 4. Luncheon will be served at 1 p.m., followed by the Annual General Meeting at 2.30 p.m., when Mr. C. W. Ward, A.M.Inst.C.E., Wakefield, after being installed President, will deliver his Presidential Address.

The "New Homes for Old" Housing Exhibition, originally opened by the Duchess of York in Westminster, will be shown in the Foresters' Hall, Kilburn, on Feb. 25 and 26, when the valuable work of the voluntary Housing Societies will be illustrated by scale models dealing with such important subjects as the living room as it sometimes is and as it might be; the history of a family in search of a home; right and wrong ways of dealing with washing; and the back-yard. The Rover Flat, a very clever adaptation of space to the needs of the growing family, will be of special interest. Models of ideal flats will be shown and of flats as they should not be, over-crowded, dirty, and insanitary. There will be demonstrations of electric and gas cooking and heating.

Strong Opinions divided the Oldham Town Council on whether gas fires should be put in one bedroom of every house on the new housing estate at Derker. The Commercial Manager of the Gas Department wrote to the Housing Department suggesting the installation of a gas fire in every house at the time that the gas cookers and wash boilers were installed; but the Housing Committee disagreed. Alderman Pollard, Chairman of the Gas Committee, said there was no extra cost for putting in the fires, but for the winter months a minimum consumption of 2500 c.ft. was fixed. Several councillors urged that tenants should have the right of choice between gas and electricity, and, on the vote being taken, the amendment that the matter go back to the Housing Committee was carried by 24 votes to 17.

European Gas Company Dividend.—The Directors of the European Gas Company, Ltd., have decided, subject to audit, to recommend a final dividend for the year 1931 at the rate of 3¼ p.ct., making 5¼ p.ct. for the year, free of income-tax.

The Directors of Messrs. Ewart & Son, Ltd., present the following statement of accounts for the year ended Dec. 31, 1931. They report that notwithstanding the general adverse trading conditions and the many difficulties that have had to be faced in the past year the trading of the Company has been fairly well maintained, and the profit earned, after making full provision for all bad and doubtful debts and contingencies, amounts to £33,644, which is available for distribution. To this has to be added £14,464 brought forward from the previous year, making a total of £48,108. The Directors recommend that the payment of the preference dividend of 16 p.ct. for the year (less income-tax) be confirmed, and that a dividend of 25 p.ct. on the ordinary shares be declared and paid (less income-tax). The Directors state that the Company's factories and plant continue to be maintained in good and efficient condition and the Company's name for high quality of manufacture has been upheld.

Midland Association Dinner and Dance.

So freshly in mind were the first annual dinner of the Midland Association of Gas Engineers and Managers, and the instant resolve (born of its success) to make the fixture an annual one, that it seemed impossible to realize that the happy gathering of over a hundred ladies and gentlemen in the Grand Hotel, Birmingham, on Monday of last week marked the fifth of these delightful functions.

The occasion was, like its predecessors, full of pleasure, and in vain might one have sought among the company for any signs of that depression of which so much is heard. The President (Mr. H. J. Woodfine, of Wellington) made an admirable Chairman, and Mr. R. J. Meiklejohn, of Rugby, an indefatigable M.C. The President-Elect (Mr. E. B. Tomlinson, Chief Engineer to the Birmingham Corporation Gas Department), in a few well-chosen words, proposed the health of Mr. Woodfine, who, he said, had made an exceptionally good President. In the course of an equally brief reply, Mr. Woodfine expressed his gratitude to his many friends for all the support they had given him. He also voiced the indebtedness of the Association to Mr. Arthur Roberts, of Hereford (the Hon. Secretary), for all the work he had done in connection with the evening's arrangements.

All enjoyed alike the music and the dancing—an item in the latter being a spot dance, the winners of the prize for which were Mr. and Mrs. R. J. Milbourne.

National Gas Council.

Meeting of the Central Executive Board.

A Meeting of the Central Executive Board of the National Gas Council was held at 28, Grosvenor Gardens, London, S.W. 1, on Tuesday, Feb. 10, 1932, at 2.30 p.m.—Sir David Milne-Watson, LL.D., D.L., in the Chair.

Gas Legislation.—The progress which was being made by the Departmental Committee on Gas Legislation was reported by the Council's representatives.

Restrictions on the Use of Gas in Council Houses.—Kettering Gas Company's Bill, 1931.—It was reported that this Bill had been introduced for the purpose of preventing the Urban District Council from imposing any conditions or restrictions with respect to the form of light, heat, or power used in Council houses. The only petition against the Bill has been lodged by the Urban District Council, and it was expected that the Bill would come up for Second Reading in the House of Commons in a few days' time.

Coal Mines Act, 1930.—The steps which the Council had

taken to obtain the views of other public utility associations with regard to the effect of the operation of Part I. of this Act, under which the Coal Quota system operated, were reported and approved.

Town and Country Planning Bill.—It was reported that under this Bill wide powers were given to local authorities to prepare schemes relating to the development and planning of land, the protection of rural amenities, and the preservation of buildings and other objects of interest.

These schemes, which only need the confirmation of the Minister of Health, may affect public utility undertakings in many ways, seeing that the operation of any enactments or any Orders, by-laws or regulations, no matter under what authority they were made, may be suspended under the scheme.

The steps which public utility undertakings were proposing to adopt in connection with this Bill were reported and approved.

Gas Lighting in Cinemas.—The proposal put forward by the Entertainments (Licensing) Committee of the London County Council to draft regulations under the Metropolis Management Act, 1878, for the purpose of prohibiting the use of gas for emergency lighting in cinemas and other places of public entertainment, was further considered. The action which the Council had taken in connection with this proposal in conjunction with certain Metropolitan Gas Companies and other Bodies, was reported and approved.

British Industries Fair.—The special attention of members of the Board was drawn to the Joint Gas Conference which is to be held on Tuesday, Wednesday, and Thursday, March 1, 2, and 3, at the British Industries Fair, Castle Bromwich, Birmingham, and members were urged to do everything possible to support the Conference.

World Power Conference.—The proceedings at the Annual General Meeting of British National Committee of the World Power Conference held on Jan. 26, which was attended by Mr. Thomas Hardie, were reported.

Fourteenth Annual General Meeting of the Council.—It was decided that this meeting should take place on Tuesday, May 10, 1932. The time of the meeting and the arrangements will be announced shortly.

Evening Star Ladies' Festival.

Many guests were present at the Annual Ladies' Festival of the Evening Star Lodge No. 1719, which was held in the Edward VII. suite of the Hotel Victoria, Northumberland Avenue, on Friday last. They were received by the W.M., Mr. A. B. Potterton, and Mrs. Potterton. Dinner was followed by a cabaret, and dancing to Sidney Jerome's Orchestra which continued until the early hours. Apart from the "Loyal Toast," the only ones were those of "The Ladies," proposed from the Chair in a classical and witty speech by the W.M., to which his sister Miss Potterton made an able reply, and "The Worshipful Master" submitted by Mr. J. A. Brentnall. Mr. Potterton, responding, took occasion to refer to the efforts of the Festival Secretary, Mr. Rae P. Normand, and Mr. A. L. Croager, who carried out the duties of organizer and M.C. The ladies were presented with a souvenir in the form of a dainty British-made jewel case. Among many well-known members of the industry present were Mr. and Mrs. J. R. W. Alexander, Mr. and Mrs. J. C. Walker, and Mr. Walter T. Dunn; and a party of veterans included Mrs. Julia King, whose late husband was Master of the Lodge in 1890, Mr. Donald Macpherson, and Mr. F. H. Lamb, together with their old friends Mr. and Mrs. Winson Scott.

Institution of Gas Engineers.

The Examinations of the Institution of Gas Engineers in Gas Engineering will be held on April 30, 1932, and in Gas Supply on May 7, 1932. The Oral Examinations will be held on June 29, 1932.

Forms of application for External Students can be obtained from the Secretary, the Institution of Gas Engineers, 28, Grosvenor Gardens, London, S.W. 1, and have to be returned not later than Feb. 29.

Candidates taking the Diploma Examination in Gas Engineering or the Diploma Examination in Gas Supply are eligible for the award of the Charles Hunt Memorial Medals.

Possession of the Diploma in Gas Engineering is one of the qualifications necessary for admittance to the Institution as a Member, while the Higher Grade Certificate in Gas Engineering is required, *inter alia*, for election as an Associate-Member. The Higher Grade Certificate in Gas Engineering or Gas Supply admits to the class of Associate.

Gas Fitting Students.

The attention of the Gas Education Committee of the Institution of Gas Engineers has been drawn to the fact that students who have been successful in obtaining the Final Certificate of the City and Guilds of London Institute in Gas Fitting often wish to proceed further and sit for the Ordinary Grade Certificate in Gas Supply, which normally involves three years' additional study.

The Committee recommends, therefore, that Gas Fitting Students, having suitable qualifications, should take classes and pass examinations in any of the following subjects (say, one subject yearly), simultaneously with the Gas Fitting Course: Practical Mathematics S.1; Engineering Science S.2; Machine Drawing S.2; Inorganic Chemistry S.1; Physics S.1.

At the end of the Gas Fitting Course they would then be able to obtain exemption in respect of such of the above subjects in which they had passed, for the purpose of preparing for the Ordinary Grade Certificate in Gas Supply. Such candidates would have to fulfil the Regulations as to hours of attendance in the Final Year of the Major Course in Gas Supply.

Overseas Trade Awaits Us.

Sir Francis Goodenough, C.B.E. (President of Incorporated Sales Managers' Association, Chairman of British Commercial Gas Association), speaking at the Inaugural Luncheon of the Sheffield Publicity Club on Feb. 10, said that publicity clubs are centres of activity having for their object not only co-operative publicity for the city they serve but also the development of the trade of that city by progressive thought and discussion leading to progressive action.

To-day, he continued, we are inclined to have too much discussion—I won't say too much thought, for I certainly do not think we have enough deliberate and clear thinking—but too little action. I never remember a time when men—whether in business or in public life—seemed less willing to take definite action. We seem to be paralyzed by the extraordinary world situation, and hesitate to adventure in any direction. That is not the attitude of mind and heart that made us the greatest trading nation in the world—or made us the greatest empire; and we have somehow or other to recover our courage, initiative, and enterprise or our trade will continue to diminish rather than develop, and we shall retire from the leadership of the nations.

Development of trade—at home and overseas—is the crying need of the hour. More trade, not less trade, especially more foreign trade, is what we need. Our ports busy, our ships full of cargo in and out of them; that is what we want to see.

How can we develop trade? Can we indeed develop it in these strange and difficult days? I believe we can, to a much greater extent than many of us are inclined to believe.

Are we all really anxious to develop overseas trade? I get so many instances brought to my notice of delay or negligence or indifference in the answering of inquiries from foreign would-be buyers that I am inclined to believe that all too many of us, avowedly or without saying so, really are in the frame of mind which says: "We cannot be bothered with overseas trade; it means so much more trouble than home trade—what with freights to consider and rates of exchange, and difficulties of credit and of language and so forth. No thank you, we would rather stick to the home market." Yet we have thousands of unemployed and works standing idle half their time while a few men who are making a handsome competency out of seeking out business for themselves in the markets of the world tell me there is a lot of trade to be got if we will send the right men to get it in the right way.

Our principals must in far larger numbers than at present leave their desks and their firesides and their golf links, and travel the world over, and they must be represented abroad regularly by those who can converse easily in the language, as well as read and write it. The public schools and secondary schools tell me they are turning out more and more young men who are good linguists, but they cannot get employers to pay a penny more for their language qualifications or give them an opening to learn business in which their languages will be useful.

And when you visit the markets of the world are you going to say: "Here's what we sell; will you buy?" or are you going to ask: "What do you want to buy? Let us see if we can make it at the right price."

Are we so sure that all our troubles are due to world

THE NEWS—continued.

conditions or home conditions beyond our control; so positive that there is nothing lacking on our part in the way of scientific production, scientific distribution, scientific marketing; so certain that the criticisms of our most friendly critics from overseas have no foundation—that we are going gloomily and fatalistically down hill without a real manly, fearless inquiry into our own selves and ways and methods, without a courageous determined effort to overcome difficulties that would never have daunted our forefathers? Are we going to leave it entirely to the politicians to rescue us—to trust to the State to remedy our state? I don't believe it. I won't believe it. But I do believe, I have had all too much cause to believe, that we have not yet, all of us, awakened to the realities, the responsibilities, and the possibilities—the great possibilities—of the situation.

This was just the case of the great Gas Industry twenty years ago. They had enjoyed virtual monopoly for a century and then were rudely awakened from complacent self-satisfaction and from neglect of the essential principle of business that study of and service to the customer is a primary duty, by the advent of a keen competitor—electricity—to which gas indeed owes the incentive that has made the Industry more alive and progressive and prosperous to-day than ever.

As the Gas Industry has done, so must we all do. We must realize that to-day marketing is more important than making.

Yorkshire Junior Gas Association.

Visit to Huddersfield.

On Jan. 16 the Association visited Huddersfield. In the afternoon, by the courtesy of Mr. Neaverson, Manager of the Huddersfield destructor works, the party inspected the Woodall-Duckham refuse incineration plant.

The installation is capable of dealing with 130 tons of refuse (with a calorific value of 5000 B.Th.U. net per lb. as charged) in eighteen hours. According to present figures the new incinerator will be called upon to dispose of 28,000 tons of refuse per year, and from this there will be recovered—apart from steam—approximately 500 tons of metals and 5000 tons of clinker, both of which are saleable, the only material to be dumped being innocuous dust, which, according to the test figures, will be approximately 15 p.ct. of the total refuse. The plant comprises eight cells of the Woodall-Duckham shaft furnace type arranged in four separate units, each unit of two cells having a water-tube and air pre-heater. The boilers are of the vertical type, constructed for a working pressure of 230 lbs. per sq. in. The steam generated by the boilers is supplied to the Electricity Department.
Table follows.

Operating Results.

Total refuse burnt	26,916 tons
,, steam produced, Bailey meter	116,475,000 lbs.
,, ,, ,, from and at 212° Fahr.	150,078,000 ,,
Average ,, ,, per hour	17,913 ,,
,, ,, ,, per lb. of refuse burnt, actual	1·913 ,,
Average steam produced per lb from and at 212° Fahr.	2·508 ,,
Average throughput per cell hour	15 cwt.
Total boiling steaming	18,416 hours
Average superheat temperature	552° Fahr.
,, feed water ,,	83·3° ,,
Total clinker produced	5683 tons
,, dust produced (dry basis)	3270 ,,
Percentage of clinker and dust to refuse burnt	33·2 p.ct.
Total metal separated	410 tons
,, current consumed, A.C.	998,934 units
,, ,, ,, D.C.	42,187 ,,
,, ,, ,, A.C. and D.C.	1,041,121 ,,

Costs of Operation.

	£	s.	d.
Treatment of boiler feed water at £15 per month	180	0	0
Transport costs for metal	35	3	0
,, ,, ,, clinker	238	12	10
,, ,, ,, dust	241	5	4
Current, 1,041,121 units at 0·46d per unit	1996	8	0
Labour, operative	5127	14	5
,, repairs	491	12	10
Total costs	£8310	16	5

Subsequently tea was provided at the Huddersfield Corporation Gas-Works, by courtesy of the Gas Department and Mr. H. Singleton, Engineer and Manager. At a meeting in the evening Mr. B. Thorpe, Chief Chemist to the Huddersfield Gas Department, delivered his paper on Naphthalene Washing, which was published in the "JOURNAL" for Jan. 27.

The Gas Industry—A Good Record.

The Gas Industry is fortunate in being able to look back with feelings of satisfaction upon the results achieved in a year fraught with financial, economic, and industrial difficulties unprecedented in gravity and extent.

This gratifying statement introduced an article on the progress of the Gas Industry, published in "The Times" Annual Financial and Commercial Review, of Feb. 9. Spectacular development was, of course, not to be looked for, it was stated, but it is no mean achievement to have maintained the position already reached, and in some direction to have surpassed it.

The article goes on to review the subject of the search for improved technique, and for cheaper and more efficient processes to be applied to the manufacture, utilization, and distribution of gas, and the treatment and marketing of residuals.

Mention is made of certain developments in the use of gas which are of general interest. It is becoming increasingly recognized that heat for a vast number of industrial processes can best be supplied by gas because of its uniformity, the ease with which it can be controlled, its dependability and cleanliness. In consequence a large number of industries which hitherto have obtained their heat from other sources resorted to gas and found it both efficient and economical. This movement is being stimulated by the Industry, which has made arrangements for making more widely known to potential users the part which gas is playing, and can play, in industry.

The Industry's policy of amalgamation was also referred to, it being remarked that several important fusions took place, while notice has been given by some of the largest concerns of their intention to absorb neighbouring undertakings. Elimination in suitable cases of small undertakings, however efficiently they may be conducted, is, in almost every case, of advantage to consumers in that they obtain a better and cheaper service.

Dinner of the Illuminating Engineering Society.

The annual dinner and dance of the Illuminating Engineering Society, which took place at the Trocadero Restaurant on Tuesday of last week, was a very bright affair. Sir Francis Goodenough, C.B.E., the President, was in the chair, and friends were delighted to find that he had completely recovered from his recent somewhat severe indisposition. Those present included the President of the Institution of Gas Engineers (Mr. J. Herbert Canning), the President of the Institution of Electrical Engineers (Captain J. M. Donaldson), the President of the British Commercial Gas Association (Major Geoffrey H. Kitson), Mr. J. F. Colquhoun (Past-President of the Association of Public Lighting Engineers), and many others who are well known in the gas and in the electrical industries. With the pleasure of dancing to follow, there was but a moderate amount of speech-making, but the short toast list was admirably dealt with.

The Minister of Transport (Mr. P. J. Pybus, C.B.E.), proposing "The Society," said that Sir Francis Goodenough, the President, carried enlightenment very far beyond the limits of that Society. As a member of the National Committee for Education in Salesmanship, he realized to the full the inspiration and enthusiasm which Sir Francis put into the work. He understood that as a result of the efforts of the President an International Conference on education for business was shortly to be held, and that His Royal Highness the Prince of Wales was interesting himself in it. Recognition of the need of education for salesmanship was spreading all over the country, and in securing this recognition Sir Francis had been the prime mover. He congratulated the Society upon its President.

Continuing, Mr. Pybus said: "What an enormous amount of education the consumer at home has needed and still needs! What glorious missionary work you have performed! And what a heart-breaking job it must have been to achieve the improvement in illumination which has so lately been evident in London and our large cities! A short time back I can remember that it pained a man to be told that the best way to test the lighting in his room was to turn his back on the light, and he would often ask what was the good of buying a light and turning his back on it. Both in gas and electricity the recorded increase in consumption is a clear proof that your work has not been in vain, and that it has produced an adequate return. The increase in both fields has been remarkable, and in many of our big centres the fortunate consumer to-day is able to choose whichever form of illumination he prefers—in short, he pays his money and he takes his choice. In our long winter the steady depression caused by climate and the

income-tax can be dissipated either by liquor or by light; and now that beer is so dear, I am informed that the common practice is to say 'Let's have another,' at which a further lamp bursts into glory. Whatever differences of opinion there may have been in the past between the gas and the electricity industries, I am sure that this new form of dissipation will unite you against a frontal attack by the brewing interests. [Laughter.] May I add one word of congratulation on the enterprise shown by the Illuminating Engineers in the organization of the magnificent displays of flood lighting that gave us so much pleasure a few months ago? Their cessation only emphasized their success. What wonderful, but formerly hidden, beauties in our monuments and public buildings your ingenuity revealed! I could not help feeling that the architects of a century ago, struggling to achieve the artistic effect of shadow in a country where there is too little sun, would have rejoiced to see the beauty created by the flood lights."

In response, the President remarked that it had been a great pleasure to have Mr. Pybus as a member of the Committee on Education. He congratulated the Society upon its progress, which was typified by the fact that they had that evening a record attendance. This was testimony to the good work of their indefatigable Secretary, Mr. J. S. Dow, who was the mainspring of the Society's activities. The membership was growing, and this growth had been stimulated by the amazing success of the International Illumination Congress last autumn. They were much indebted to Mr. C. C. Paterson for his Presidency of that Congress, and they also owed a great deal to Mr. P. Good for the work he did as Chairman of the London Committee, as well as to Mr. C. W. Sully and to Col. C. H. S. Evans, who acted as Secretary, and did an amazing amount of work.

The only other toast was that of "The Guests," proposed by Mr. C. W. Sully, Vice-President of the Illuminating Engineering Society, and responded to by Captain Donaldson and Mr. Sydney Tatchell, Vice-President of the Royal Institute of British Architects.

Why the Grid?

In a letter to the "Lewisham Journal," Friday, Jan. 22, Mr. E. G. Pink states:

The main obstacle to cheap electric energy is the wasteful process of bulk supply by steam plant and long distance transmission by the grid. The development of the internal combustion engine has rendered this unnecessary. Any municipal engineer may now buy oil or gas engines and put low-pressure, continuous current, electric energy directly into the local mains. Briefly, it may be said that the steam turbine puts electric energy into a £50,000,000 grid that terminates at the low-pressure terminals in the distributing sub-station; that the gas engine puts electric energy directly into those low-pressure terminals and dispenses with the £50,000,000 grid; that the obvious question for the layman is, "Why use the grid?"

Tar for Roads.

The British Road Tar Association showed at the Forum Cinema, Birmingham, on Wednesday last, to an audience of over 300 surveyors, public works contractors, gas engineers, and industrial chemists their film entitled "Coal Mine to Road." The film was presented with a running commentary by Mr. Reginald G. Clarry, M.P., Chairman of the Association.

Following the presentation of the film the guests were entertained at luncheon at the Grand Hotel, Mr. Reginald G. Clarry, M.P. (Chairman), being supported by the Lord Mayor of Birmingham (Alderman J. B. Burman) and Mr. P. J. H. Hannon, M.P. Many Midland authorities—Public Works Committees, Highways Committees, and Gas Committees and Companies— were represented.

Mr. HANNON, in proposing the toast "The British Road Tar Association," declared that tar was one of the most important substances produced in the history of mankind, and had been the means of providing the country with safe, durable, and dustless roads. Transport in these days had become a matter of primary consideration in the economics of productive enterprise. The Association by their intelligent appreciation of the scientific and practical value of an article which entered so largely and with such great success into providing facilities for transport was something that must commend itself to all of them. Those who had seen the practical application of tar could not but be impressed with its immense economic value.

The toast was supported by Mr. HERBERT H. HUMPHRIES (City Engineer and Surveyor of Birmingham), who commented on the educational value of the film. Mr. Humphries declared that for a certain class of road he was certain there was nothing to beat tarmacadam, which gave a perfectly safe and reliable surface.

Responding, Mr. CLARRY pointed out that the commodity had been brought to a state of efficiency for its various requirements, and in no district had greater progress been made than in the Midlands by the Midland Tar Distillers.

Reduced Charges for Gas in East Surrey Area.

The Directors of the East Surrey Gas Company have informed their consumers by ordinary meter that a further reduction in the price of gas—amounting to two-fifths of a penny per therm—will be made after the reading of the meters for the December Quarter, 1931.

Attention is called to the following scale of rebates for large consumption and special rates for gas used for central heating and in gas engines:

For Large Consumption (other than for supplies for Central Heating and Gas Engines).

Consumption per calendar year—	
On first 1250 therms	No rebate
On next 1250 ,,	5 p.c. rebate
On next 2500 ,,	7½ ,, ,,
On next 5000 ,,	10 ,, ,,
On all consumption in excess of 10,000 therms	12½ ,, ,,

Special Rebate for gas used for central heating.

Gas used for central heating—registered by special meter—is subject to a rebate of 33⅓ p.ct., irrespective of the quantity consumed.

Scale of Rebates for Consumption in Gas Engines—registered by special meter.

When consumption per calendar year exceeds 250 therms—	
On first 500 therms	7½ p.ct. rebate
On next 1000 ,,	10 ,, ,,
On next 2000 ,,	15 ,, ,,
On all consumption in excess of 3500 therms	20 ,, ,,

Dry Gas Meters.

Mr. J. Kelly, the Engineer, Manager, and Secretary of the Bridlington Gas Company, occupied the chair on Thursday evening, Feb. 4, when Mr. J. H. Bingham, of Messrs. George Glover & Co., Ltd., Ranelagh Works, Chelsea, addressed the staff and fitters of the Undertaking on the subject of "Dry Gas Meters." There was an excellent attendance, and Mr. Bingham's address was followed by a lengthy discussion. The number and variety of questions asked gave evidence of the keen interest in the design and function of the gas meter.

In proposing a vote of thanks to Mr. Bingham and Messrs. George Glover & Co., Mr. Kelly announced that he intended awarding two prizes for the best essays on the subject-matter of the address.

The staff and fitters of the Scarborough Gas Company attended, on Friday evening, Feb. 5, to hear a similar address given by Mr. Bingham. Mr. Milner presided, and the address was followed by a long and interesting discussion.

A hearty vote of thanks was accorded to Mr. Bingham and Messrs. George Glover.

Portsmouth Plant Extensions.

At the Portsmouth Gas Company's Annual Meeting, the Chairman referred to recent plant extensions and prospected ones at the gas-works. The result of an installation of coke breaking and grading plant at Flathouse has, he said, been to provide a coke more suitable for domestic consumption than previously, and the experience has decided them to lay down similar plant at Hilsea. Similarly he was able to report satisfaction with the reconstructed carbonizing plant at Flathouse. The opening of this C.O.L. plant was recorded in the "JOURNAL," and it has proved an economical and highly flexible installation, eminently suitable for treating Durham coals. The Contractors were Messrs. Gas Chambers and Coke Ovens, Ltd.; and Mr. Lapthorn congratulated them on providing a good piece of work which had come up to the guarantees in every respect.

The Company's continued development now necessitates extensive reconstruction of the horizontal bench at Hilsea, built in 1905. The present building is too narrow to accommodate modern horizontal settings, and it has been

THE NEWS—*continued.*

decided to replace these also with intermittent vertical chamber ovens. The installation will include demolition of existing buildings, new concrete foundations, coal breaking and handling plant, waste-heat boilers and chimneys, and a lift; and the successful tenderers were the Woodall-Duckham Company. It is anticipated that the total cost of the extensions will amount to £55,000 to £60,000. The plant will carbonize 250 tons of coal a day, and is to be put in hand at once; and as much local labour as possible will be employed.

Gas Exhibition at Cowdenbeath.

The Cowdenbeath Gas Company, Ltd., held a successful four days' gas exhibition and cookery demonstration in the New Co-operative Hall, Cowdenbeath, from Feb. 2 to 5.

At the opening ceremony, Mr. J. Miller Thomson, Chairman of the Company, who presided, said that he could assure them that the Gas Company were satisfied that they would best serve their own interests and the interests of their shareholders by giving the best service to the community; and the object of that demonstration was to lay before the public the facilities that were available for making the best use of gas as a provider of light, heat, and power. He was satisfied that there was still a great future before the Gas Industry and that it still offered an unlimited field to the engineer, the chemist, and the general inventor. He did not wish to say anything about the rival form of energy, electricity, but there was no doubt that when one considered the value of the bye-products of the production of gas as well as the value of the gas itself, the thermal efficiency of gas was far ahead of that of electricity.

Provost King, Cowdenbeath, who declared the exhibition open, confined his remarks to the domestic use of gas. In Cowdenbeath they had always been accustomed to the coal fire, especially in miners' houses, and there was just the possibility that the minds of his audience were a little prejudiced. If they could break down that prejudice the Company were perfectly justified in coming to Cowdenbeath at any time to demonstrate the efficiency and economy of gas fires and various other appliances. While coal fires caused a considerable amount of labour, the gas fire met every possible need. It was simple to operate. It was safer, cleaner, with no work, no worries. The Directors of the Company were anxious that there should be a reduction in the price of gas, and the only way that could be done was to increase the consumption. The gas-works indirectly employed nine miners every day. If they could increase their output by 50 p.ct. they would create work for 14 or 15 men.

How to Retain the Public Lighting Load.

We have received from Mr. J. W. Lofts a valuable booklet on "The Public Lighting Load; and how to retain it," which is a reprint of a lecture delivered by Mr. Lofts at a Section Meeting of the Manchester District Association of Gas Engineers in November last.

The author describes the lamps manufactured by his firm, Messrs. Wm. Sugg & Co., Ltd., and various directional devices; and he makes a strong point of the desirability of employing governors. His concluding remarks are as follows:

While I freely admit that there are a number of gas engineers who are standing up to the threat of electricity to obtain their street lighting, and are meeting the situation, I feel there are still a large number who do not take the position seriously, and who seem quite content to sit in their armchairs without worrying about the matter. Although it is possible that severe electric competition does not threaten them to-day, it may do so to-morrow, or in the near future, and often the matter is left too late to save the situation.

It is surprising the number of cases we come across, of urgent appeals for something to be done to enable the gas undertaking to meet electric competition, by the sending of samples of lamps, &c., per passenger train, and so on; but surely the question demands careful thought beforehand, and the acquisition of full knowledge of what electricity can do, and further by approaching the public authority for permission to make a display of what gas can do, by putting up a modern sample installation—in other words, by making complete preparations. The electricians are men who know their job, and who possess energy and determination to secure the public lighting.

We cannot afford to say good-bye to our public lighting, for it is the most powerful advertisement we possess. The talk around fog penetration, glare, &c., is not often considered by the public authority, their decision being made, as a rule, on price alone. We are constantly, by means of applied thought, laboratory research, &c., seeking to find more efficient fittings. Therefore, it is a matter for co-operation—the manufacturers themselves to be constantly on the alert to evolve the most efficient lamps and fittings, and the engineers to be likewise constantly on the alert to supply their gas and maintenance at the lowest possible figure. By such co-operation, there is no reason, to my mind, why we should not retain and extend our public gas lighting.

Continuous Annealing of Brass.

Results over a period of more than two years on the first continuous large brass coil annealing furnace fired with town gas have been gratifying. They form the subject of an article by Mr. W. W. Young, of the Connecticut Light and Power Company, in the "Gas Age-Record." The furnace was built by the Surface Combustion Company in 1929, and it is now operating 24 hours per day, four to five days a week, as a production unit on finish annealing. It is 30 ft. long by 8 ft. wide by 7 ft. high. The conveyor extends 10 ft. beyond the furnace at the charging end and 15 ft. on the discharging end. The heating chamber is divided into three approximately equal zones. Control on the first zone is by hand, and it is operated at a temperature head for fast heating. The second and third zones are fitted with automatic temperature control. In the third zone the brass is soaked to attain uniformity. There are 26 high-pressure burners operating with 530 B.Th.U. gas at 10 lbs. pressure. Each burner has a capacity of approximately 300 c.ft. per hour, so that the total consumption of the furnace is about 7800 c.ft. per hour.

Operating figures for the furnace are given as follows: The production capacity is 5000 to 6000 lbs. of brass per hour. Temperatures used vary from 1100° to 1250° F., depending on the degree of anneal and type of charge. Actual tests on 24-hour operation, 125-hour week, with an average temperature of 1150° F. and average composition of charge about 65 per cent. copper and 35 per cent. zinc show a gas consumption of 0·66 c.ft. per pound of net brass. Eleven-hour operation, 60-hour week, with the same temperature and composition averages, show a gas consumption of 0·85 c.ft. per pound. These consumptions include the gas used for heating up and for pilot over shutdown. The over-all efficiency on a 24-hour basis worked out from the above figures is about 29 per cent.

A uniform anneal is obtained, the maximum variation in grain size being less than on other furnaces used for this type of work. The surface of the metal is slightly oxidized, but pickles very readily to give an excellent finish.

Walking Beam Furnace.

A type of furnace used extensively for normalizing and similar heat treating operations, and also for billet heating, is the walking beam furnace. One such furnace is described by Mr. L. E. Biemiller, of the Consolidated Gas, Electric Light, and Power Company of Baltimore, in a recent issue of the "American Gas Journal." There are two beams in the hearth of the furnace. These have a rectangular motion and lift the billets 3 in. above the fixed portion of the hearth on the upward stroke. On the downward stroke the moving beams drop 3 in. below the fixed portion of the hearth. The forward and backward movement of the beams is adjustable to suit the various sizes of billets. The beams operate alternately—that is, the left-hand beam is lifting while the right-hand beam is lowering, and *vice versa*. The movement of the beams is obtained from two cylinders operated by pressure from an oil gear pump. One piston provides the forward and backward motion and the other the vertical motion. Each beam is mounted on two pairs of wheels, one pair near each end of the beam. The wheels are carried on levers and the levers are actuated in turn by the cylinder referred to for obtaining the vertical motion. The longitudinal motion is transmitted to the beams by means of an arm which engages against the connecting rod from the other cylinder. The beams consist of heavy structural steel members, plated over and carrying cast-iron brackets to which are mounted heat-resisting alloy rails on which the billets rest. The space between the rails is lined with refractory insulation.

The billets handled are from 4 to 8 in. in diameter and weigh 150 to 500 lbs. The capacity of the furnace is 28,000 lbs. of copper, brass, or bronze alloy per hour. An automatic charging conveyor takes the billets from the floor where they have been placed by a crane, and carries them up into the furnace. This conveyor is synchronized with

the walking beam mechanism. The billets are automatically discharged down a roller conveyor.

The hearth is 42 ft. long and accommodates two rows of billets. There is a 29 ft. heating and a 11 ft. soaking zone, each under automatic temperature control to *plus* or *minus* 10° F. Both temperature settings and production speeds are readily changed. The two walking beams may be operated in unison, or alternately.

The lining consists of 9 in. of firebrick, 9 in. of "Superex" and 3 in. of magnesia block. There are ten burners in the heating zone and four in the soaking zone, each using gas at 8 in. and air at 1 lb. pressure, mixed proportionately. The total burner capacity is 16,500,000 B.Th.U. per hour. When operating at full load of 28,000 lbs. per hour, heated to 1450° F., the gas usage is the equivalent of 10,125,000 B.Th.U. per hour. At 25, and 50 p.ct. load, the gas usage is the equivalent of 5,510,000, and 7,125,000 B.Th.U. per hour, respectively.

Heat Treating Motor Car Wheels.

In a recent issue of the "American Gas Journal" Mr. W. Gordon Park described how continuous liquid heating solved the heat treatment problem for a large automobile wheel manufacturer. With former methods the wheel hubs were lead hardened by the batch method, employing manual labour. This method was slow, cumbersome, and unreliable, and proved a real restriction to the volume of production necessary.

In consequence, a special gas-fired furnace, with quenching units and conveyor mechanism, was designed to coordinate perfectly with production flow, without alteration of the regular production operations. The furnace, by the Surface Combustion Corporation, was designed for a capacity of 90 hubs per hour at a bath temperature of 1600° to 1670° F., while the combustion chamber temperature below the pot is approximately 1950° F.

The material handling mechanism is designed to coordinate with a production of 90 hubs per hour. Hubs are placed in a carrier which is removably suspended from the furnace conveyor. The conveyor takes the hubs through a preheater. They are then lifted automatically over the lead pot and immersed. The hub remains in the furnace 197 seconds.

The hub is then lifted out of the furnace and placed on a stationary support which suspends the hub $\frac{3}{8}$ in. on the lower end in the oil bath. The oil bath cycle is adjustable —from 1 to $5\frac{1}{2}$ seconds. At the end of the predetermined time the hub and carrier are removed from the oil bath station and transferred to a caustic soda spray head. As the hub is set down on the spray head a valve is automatically opened and the inside of the hub is sprayed. At the end of 29 seconds the hub is removed from the spray head and the flow of the liquid automatically cut off.

The carrier and the hub are replaced on the conveyor in a water bath, having been lifted over the side of the tank by means of a transfer mechanism. Here the hub is completely immersed. After remaining in the bath approximately five minutes the carrier and hub are removed from the conveyor, lifted over the end of the tank and replaced on the conveyor. The hub is then removed from the carrier for inspection of hardness and the final grind. The carrier continues on the conveyor for another cycle.

The labour of six men, under the old batch method was reduced to one man who merely checks temperatures, timing, and the functioning of the conveyor system. By concentrating the equipment a great deal of floor space is saved. The inaccuracies of the personal element in the heat treating under batch methods have been entirely eliminated. Rejects are negligible, approximately 1 in 300 hubs. The entire unit is portable to facilitate changes in plant lay-out, expansion, &c. Under the old method it was impossible to hold the uniformity of heat treatment accurately enough from a production standpoint to utilize the forging as the other race of a roller bearing, where tolerances cannot exceed ±·003. This was effectively accomplished with this new equipment. Lead carry-off was also reduced with the continuous method.

This furnace is operating 23 hours per day, the only time lost being a half-hour at midnight and noon. The installation has been so successful that a duplicate extra unit is being constructed to take care of increased production requirements. Continuous liquid heating, a new development, presents a large field for economy in many industries. Its possibilities are practically unlimited in the replacement of batch methods of pot hardening.

IN pursuance of a policy (evidenced by the first publication in 1891 of Newbigging's book) of providing the Gas Industry from time to time with the most authoritative information on the intricate subjects of Income-Tax and Local Rating, we are proceeding with the re-publication of Seymour's "Assessment of Gas Undertakings," brought up to date by the addition of a Supplement.

Early March will see the book on sale at 15/- post free.

There are also available a few copies of the First Edition, and these will be supplied, together with the Supplement, to any who might prefer the handling of two separate books in making back references—the price in this case will also be 15/- post free.

Successive alterations in legislation have occurred since Mr. Seymour's work was produced two years ago; and the Supplement includes notes on the relevant provisions of the Finance Acts of 1930, 1931, and 1931 (No. 2), as well as the appropriate resolutions of the Central Valuation Committee as affecting the rating of Gas Undertakings.

For the benefit of those who already possess a copy of the First Edition, the Supplement will be offered separately at 5/- post free.

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REVIEWS

ATMOSPHERIC POLLUTION.*

Estimates of the amount of tar, soot, and other impurities deposited from the air during the twelve months ended March 31, 1931, at 98 observing stations situated in 42 important towns and cities in Great Britain, and estimates of the amount of impurities suspended in the atmosphere at observing stations in London, Glasgow, and three other towns, are contained in the Seventeenth Report on Atmospheric Pollution issued by the Department of Scientific and Industrial Research. In industrial districts the amount of solid matter deposited or brought down by rain varied from 550 tons per square mile at one point in Lancashire to just over 72 tons at Western Park, Leicester. The average deposit recorded is between 200 and 300 tons per square mile.

At about two-thirds of the observing stations a reduction in the total amount of impurity deposited is recorded. The most remarkable improvement is shown in the deposit of sulphates where 35 stations have a reduction of deposit. This result is the more satisfactory as it is well known that sulphur in the atmosphere plays a considerable part in the damage done to buildings by smoke which in the case of Government buildings alone Sir Frank Baines once assessed at £120,000 per annum.

The general improvement, however, does not apply to certain London districts. At Ravenscourt Park in West London, for example, the increase in sulphur deposit has been very excessive, amounting to nearly three times the previous average. At Golden Lane near Finsbury Circus the tar deposit has increased nearly 3½ times. No definite explanations are given in the Report for these increases.

As regards impurity suspended in the atmosphere, it seems probable that London may have to put up with black fogs for many years to come. According to the Report, "sufficient smoke is emitted in London during two or three hours of a winter's morning to produce the blackest fog of which we have any experience, provided that it fails to be carried away, and given that the atmospheric conditions are suitable for this accumulation. A reduction in the rate of smoke emission by one-third would probably appear simply as a delay in the formation of the fog, that is, if under previous conditions the smoke density in the fog attained its maximum in two hours, under the new conditions it would take three hours. Looking at this matter in another way, it does not appear from the deposit records that there has been any material reduction in pollution during the last ten years; hence it is difficult to account for the general optimistic belief in the reduction of smoke fogs."

Smoke Haze in London.

One remarkable fact about London's atmosphere is the extent to which thick smoke haze appears to be local. The neighbourhood of Charing Cross would seem to be one of the smokiest spots in London. During the winter months of 1930-31 a thickish smoke haze was recorded by an automatic recorder at the Westminster City Hall on 135 days, while at Westminster Bridge an instrument recorded a similar haziness on 79 days, one at Victoria Street on 63 days, and one at South Kensington on 58 days. At Kew Observatory, on the other hand, only 19 hazy days were recorded. A smoky fog in London appears likely to be at its maximum at 10 a.m., but the smoke haze thickens again between 7 p.m. and 8 p.m.

The amount of smoke haze in London is apparently far worse than in many industrial centres. In the same months the Glasgow Stations recorded on the average 30 hazy days, while Blackburn had 13 days and Stoke-on-Trent 10.

The most remarkable records come from Coventry, which had not one single day in the period under review on which smoke haze was recorded. The atmosphere at Coventry may therefore be taken as unusually pure for a city of that size. The Report quotes the views of the Medical Officer of Health as to the possible causes of this condition as follows:

> I doubt if any manufacturing town approximating to the size of Coventry can lay claim to a purer atmosphere; and I suggest several reasons for this—viz., (1) There are no adjoining industrial towns to add pollution—the city is surrounded by open country, no part of which has an altitude sufficient to cause interference with the scavenging action of the wind. (2) Some of our largest factories are situated on the outskirts of the city in semi-rural surrounds. (3) Our sources of smoke production are unusually limited for a manufacturing town of this size. Electricity is very cheap here and all large factories use it for power purposes, and gas, which also is cheap, has to a great extent superseded solid fuel in the treatment of metals. (4) We find it unnecessary to employ a special smoke inspector. (5) The prevalence of the use of gas stoves and gas fires for cooking and heating is another contributory factor in the minimizing of the smoke from dwelling-houses. I am informed by our Gas Department that there are over 41,000 gas cookers and 14,500 gas fires installed at the present time, and that during the coal stoppage some years ago only 98 persons applied for coal permits on the ground that they had no gas stoves. (6) The comparative population density is low—viz., 13·4 per acre.

In previous reports on atmospheric pollution it has been pointed out that no reliable information exists regarding the extent to which pollution in a particular town may be partly due to impurities carried from neighbouring towns. The present Report records the completion of an experiment to obtain definite data as to the distance to which pollution can be carried by wind from an urban area. Norwich was selected as the site of the investigation, because of its isolation from other industrial areas, and because of the number of roads radiating from it in different directions. The results show that the pollution decreases inversely as the distance of the city and was measurable with the apparatus used at a distance of 5-6 miles down wind from the centre of the city. Norwich is about two miles in diameter, and, assuming the same conditions, the Report suggests that pollution from a town or a group of towns 24 miles in diameter would be perceptible at a distance of between 60 and 70 miles. This distance would be greater or less according to whether the air was polluted more or less than that of Norwich whose air was, in fact, found to be relatively very clean.

The Report records that during the year the development of a simple method for the routine determination of sulphur in the atmosphere has been completed, and a description of it issued to co-operating local authorities. The National Physical Laboratory have also completed their work on an instrument for the measurement of daylight which is now being tested by the Atmospheric Pollution Research Committee. The National Physical Laboratory are also carrying out work on the amount of water in fog as opposed to smoke particles. An attempt is also being made to devise means for distinguishing grits emitted by different types of furnaces from one another.

* Department of Scientific and Industrial Research: Investigation of Atmospheric Pollution. Report on observations for the year ended March 31, 1931. H.M. Stationery Office; price 5s. 6d.

"LUBRICATING OIL TESTS AND THEIR SIGNIFICANCE."*

This book is written by an authority on the subject and explains in simple language the various methods used for testing lubricating oils and the practical significance of these tests.

A considerable amount of progress has been made in recent years in our knowledge of the testing of oils, and while the author does not suggest that oils can be judged simply on laboratory work, it is possible now to forecast with some accuracy what a lubricant is likely to do under practical working conditions. To do this, however, it is essential to take into consideration such factors as "oiliness"—the property that enables an oil to form an adsorbed film on the metal surfaces—and the ability of an oil to resist oxidation.

Until recently no accurate method of measuring "oiliness" was known, but Mr. Southcombe, in a note on this important subject, describes a new "oiliness" testing machine that has proved satisfactory.

Some of the tests that have been accepted as indication of an oil's quality are shown to be no longer satisfactory, and there are some useful notes on the drawing up of oil specifications. A classified short bibliography suggests books and papers likely to interest those who wish to study the subject in greater detail.

* "Lubricating Oil Tests and their Significance," by J. E. Southcombe, M.Sc. Published by Henry Wells Oil Company, Ltd., 736-739, Salisbury House, London, E.C. 2; price 2s. 6d. net.

SPIRAL GASHOLDERS

By S. M. MILBOURNE, A.M.I.Struct.E.

A brief treatise investigating from a mathematical standpoint, as far as possible, the main loads and stresses induced in the various members which constitute the spiral guided gasholder. The determination of the actual sections required safely to withstand these loads is then a matter of arithmetical computation and practical experience in design

(*Continued from p.* **308.**)

In order to determine the most unfavourable condition of stress to which the sides of any fully inflated lift are subject, it is necessary to add the values of f_1, f_9, f_{10}, f_{11}, and f_{12} at the principal points on the axis to which they refer. It will be realized, however, that when considering the case of a lift half immersed in the water the values of the stresses will vary according to p_1, P_1, and P_2, so that these will be distinct from the values of the stresses obtained when the lift is fully inflated. Fig. 16 shows diagrammatically the manner in which the summation of the stresses in the side sheeting of a lift may be effected.

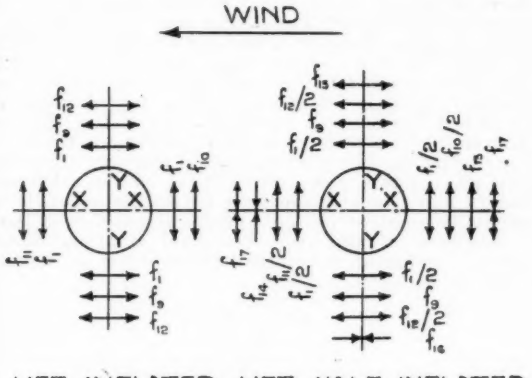

Fig. 16 (a). Fig. 16 (b).

Fig. 16 (*a*) illustrates the stresses operating on the sides of a fully inflated lift. Fig. 16 (*b*) indicates the stresses on the sides of a partly submerged lift. The values of f_1, f_{10}, f_{11}, and f_{12} may be halved in the case of the latter condition, as they are dependent upon the value of rdp_1 and P_1, which are halved, while the sectional area of the material over which the loads operate remains practically the same. It follows that when a lift is nearly fully inflated and is just about to cup, the stresses in the sides are resisted to a considerable extent by the cup ring. The equations by which the stress in the cup rings may be determined are also similar to (29) and (33). Then allowing for the whole of the stresses to be resisted by the cup, the equations become:

$$f_{18} = f_{19} = \frac{\cdot 21 P_2}{A_3} \qquad (35)$$

where f_{18} = the tensile stress induced in the cup ring on the windward side of the holder on the axis XX,
f_{19} = the compressive stress induced in the cup ring on the leeward side of the holder on the axis XX,

also

$$f_{20} = f_{21} = \frac{\cdot 21 x_5 P_2}{r_2 A_3} \qquad (36)$$

where f_{20} = the tensile stress induced in the cup ring on the axis YY at 90° to the direction of the wind,
f_{21} = the compressive stress induced in the cup ring on the axis YY at 270° to the direction of the wind.

The tensional stress on the cup ring due to the internal gas pressure p_1 is deduced from equation (22) and may be written thus:

$$f_{22} = \frac{dr p_1}{3A_3} \qquad (37)$$

where f_{22} = the tensional stress in the cup ring due to internal gas pressure on the axes XX and YY.

The stress in the cup of the lift when nearly fully inflated due to the maximum value of the force system $[x_5]$ is deduced in a similar manner to equation (34), and may be written as follows:

$$f_{23} = \frac{x_5}{2A_3} \qquad (38)$$

where f_{23} = the tensile or compressive stress induced in the cup section on the windward and leeward side of the lift on the axis XX.

As the bottom curb on the outer lift is subject to the same conditions of stress as those enumerated in equations (35), (36), (37), and (38) when the holder is fully inflated, the values of the stresses in the bottom curb may be determined from these equations after substituting A_4 for A_3 when A_4 = the equivalent area of the bottom curb. The sectional area of the buttom curb usually constitutes the two bottom tiers of side sheeting of the outer lift, together with the curb angles or channels. Fig. 17 shows diagrammatically the manner in which the stresses on the cup and bottom curb rings may be summed at points on the principal axis.

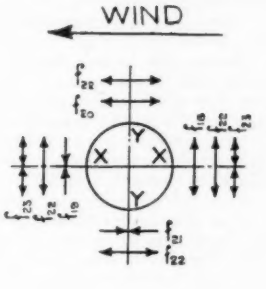

Fig. 17.

When a holder is inflated, the vertical tensile stress in the sides of any lift due to the weight of the hanging lifts (W_0) may be ascertained approximately from the expression

$$f_{24} = \frac{W_0}{\pi D t + A_5} \qquad (39)$$

where f_{24} = the vertical tensile stress in the side sheeting and framing of the lift on the axes XX and YY,
A_5 = the equivalent cross-sectional area of all the vertical stays in the lift.

When the inflated lifts are under the influence of the wind load, a compressive stress is set up in the vertical stays of the lifts due to the vertical components of the force system $[x_1]$. This stress reaches its maximum value in the panels adjacent to the axis YY and may be represented by the equation

$$f_{25} = \frac{x_1}{\Sigma A_5} \qquad (40)$$

where f_{25} = the maximum compressive stress in the vertical stays on the axis YY due to shearing load of wind,
ΣA_5 = the sum of the equivalent sectional areas of the vertical stays included in one square panel of side sheeting.

The maximum value of the compressive stress in the vertical stays of the inflated lifts will then be approximately $f_{25} - f_{24}$ on the axis YY.

So far as the floating lift is concerned, there is, however, the influence of the force system $[x_4]$ to be considered. This force system tends to induce tensional stresses in the sheeting and framing of the lift on the windward side of the structure and compressive stresses in the vertical stays on the leeward side of the holder. The maximum value of

these stresses may be roughly estimated from the following equations:

$$f_{z6} = \frac{n_2 x_4}{\pi D t + n_1 \Sigma A_5} \quad \ldots \quad (41)$$

where f_{z6} = the maximum tensile stress in the side sheeting and vertical stays of the lift on the axis XX on the windward side of the holder due to overturning moments $\mathbf{M} + m$,

and

$$f_{z7} = \frac{n_2 x_4}{n_1 \Sigma A_5} \quad \ldots \quad (42)$$

where f_{z7} = the maximum compressive stress in the vertical stays on the axis XX on the leeward side of the holder due to overturning moments $\mathbf{M} + m$.

Therefore, the maximum stresses induced in the side of the floating lift may be determined from the summation of the values obtained in equations (40), (41), and (42) on the axis of the holder to which they refer.

When the holder is fully inflated, the various force systems due to the shearing and overturning moments of the wind and snow loads are transmitted through the roller carriages to the tank balcony. In cases where the holder is only partly inflated and one or more lifts remain at rest in the tank, these forces are brought on to the dip rings of the stationary lifts. The radial forces transmitted by the inflated lifts are resisted by the dip rings when the resulting wind and snow load is small, but under the action of the maximum pressure of wind and snow, the majority of the load is eventually brought on to the tank balcony ring as the dip rings are incapable of sustaining deformation to any appreciable extent.

The vertical forces such as are represented by the system $[x_i]$ are transmitted from the guides of the floating lift to the dip ring of the subsequent stationary lift. These forces when brought on to the sides of the stationary lift, tend to raise the lift on the windward side of the structure. If the weight of the stationary lift is insufficient to counteract the pull of the floating lift, then upward movement is prevented by the interaction of the guide rails of the stationary lift with the carriage rollers on the dips of the outer lifts or tank balcony. On the leeward side of the holder, where the downward thrust on the carriages is sustained, a large proportion of the load is resisted by the vertical stays, as the side sheeting and spiral rails do not take any appreciable proportion of the direct thrust. The side sheeting and spiral rails, however, very greatly assist in stiffening the vertical stays by restricting the lateral deflection. It will therefore be seen that the compressive stress on the vertical stays of a stationary lift on the axis XX on the leeward side of the structure may be estimated from equation (42).

It will be realized that the compressive stresses as calculated from equations (40) and (42) make no allowance for lateral flexure such as is common to long columns, and due allowance in determining the safe stress value must therefore be made for radial deflection of the vertical stays between the points of intersection with the guide rails.

In all the above equations for deducing the stresses in the various portions of the structure it will be understood that the joint efficiency or equivalent area of the section must be taken into consideration.

Steel Tank.

The balcony is under conditions of maximum stress when the gasholder is fully inflated, as it is then subject to the full force of the wind load. Forces operating on the tank balcony ring are, of course, similar to those previously described which act on the bottom curb of the outer lift, but will be opposite in sign. The direct stresses in the balcony ring may therefore be ascertained from equations (35), (36), and (38) after substituting the equivalent sectional area of the balcony (A_6) for A_1 and reversing the sense of the stresses in each case. The local action of the wind load on the upper half of the tank induces a system of forces identical with $[w]$ and $[x]$. The direct stresses in the balcony ring due to these force systems may then be obtained directly from equations (15) and (16) after substituting $\frac{P_1}{2}$ for P_1 and A_6 for A_1. The sectional area of the balcony usually constitutes the top tier of tank plates, the balcony plates, and the inner and outer rows of angles or channel curbs. In addition to the direct stresses on the tank balcony there are also the stresses due to bending to be considered. These stresses are partly resisted by the action of the water pressure on the tank sides and partly by the resistance of the material in the balcony cross-section.

The bending stresses due to the horizontal force systems operating on the balcony are most effectively resisted by the action of the water pressure on the sides of the tank. Assuming that the distortion of the balcony ring is from its original circular shape to that of an ellipse, it may be shown that the bending moment is represented by the following equation:

$$M_1 = p_3 \delta_1 r_1 \quad \ldots \quad (43)$$

where $\mathbf{M}_1$ = the bending moment in the balcony ring,
p_3 = the pressure of water per unit of circumference,
δ_1 = the deflection (the difference between the length of the major or minor axis of the ellipse and the radius of the original circle),
r_1 = the original radius of the balcony ring.

From the theory of liquid pressure, it follows that about one-third of the pressure of water acting on the total depth of the tank will tend to resist deformation of the balcony ring. Now if values be substituted in equation (43) it will be seen that the balcony is relieved of a considerable proportion of the bending moment for comparatively small deflections of the ring. In these circumstances, it is reasonable to assume that about one-quarter of the bending moment only is resisted by the material constituting the balcony. The bending moment due to the horizontal systems of loads on the balcony ring may be approximately estimated by resolution of all the co-planar forces at each point into directions normal to the two principal axes X_1X_1 and Y_1Y_1. The bending moment in each section of the ring is then calculated in the usual manner common to semi-circular metal arches.* Fig. 18 (*a*) represents the form of bending moment diagram about the principal axis X_1X_1. The ends of the semi-circular rings are treated as "fixed," as the forces normal to this axis are of similar sign and practically equal in magnitude. Fig. 18 (*b*) shows the form of bending moment about the axis Y_1Y_1. The ends of the semi-circular rings at these points are treated as "free," since the forces on one side of this axis are operating in the opposite direction to those on the other side; therefore fixing moments cannot be maintained. By the algebraic summation of these values at each point round the periphery of the ring, the final bending moment diagram is obtained, a typical form of which is shown in fig. 18 (*c*).

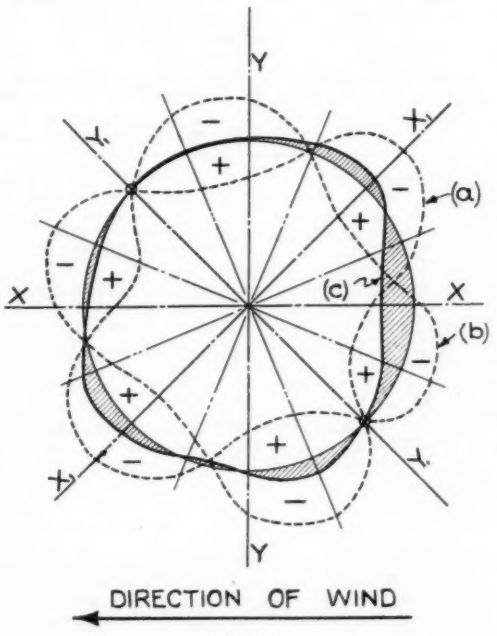

Fig. 18.

The moments tending to pull the balcony towards the centre are shown positive, while those tending to force the ring outwards are indicated as negative quantities. The stresses in the balcony are then obtained by equating one-quarter the maximum positive and negative bending moment values to the moment of resistance of the tank balcony section. The stresses resulting from the bursting pressure of the water on the top tier of side plates and also the stresses due to the reactions of the direct forces on the axes XX and YY are then added algebraically to the bending stresses in order to ascertain the most unfavourable condition of loading on the cross-section of the tank balcony.

The method of calculating the tensional stress in the tank side plates due to the pressure of the water is well known, and the resulting equation giving the tensile stress

* See "Theory of Structures," by Prof. A. Morley, D.Sc.

(f_{z8}) in tons per square inch in the plates at any point at distance d_1 feet from the top of the tank is

$$f_{z8} = \frac{10^{-3} \times 1{\cdot}17 D_1 d_1}{t_1} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (44)$$

where D_1 = the diameter of the tank in feet,
t_1 = the thickness of plate at a distance of d_1 feet from top of tank.

By equating for t_1 and introducing the joint efficiency ratio of the vertical seams, the thickness of plate in each tier may be ascertained for any desired value of f_{z8}.

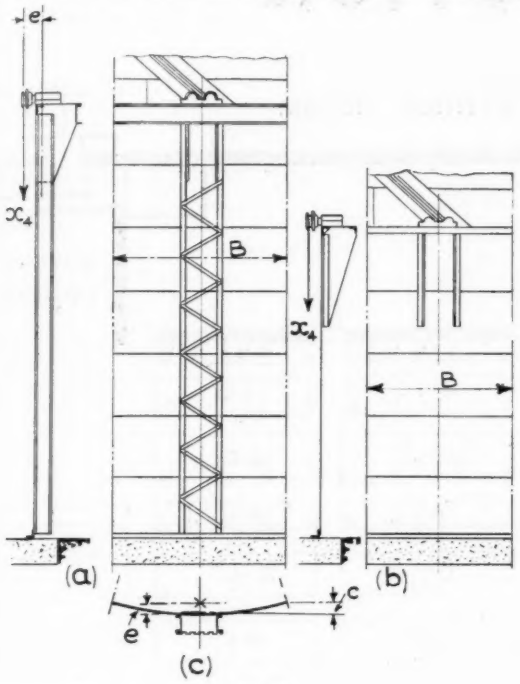

Fig. 19.

The tensional stress set up in the tank side plates due to the full shearing load of the wind on the balcony is identical with the stress induced in the side sheeting of a lift under similar conditions of loading—see equation (23). However, as the stress values are very small in the case of the steel tank, their influence need not be considered.

In order to relieve the side plates of the tank from the full upward or downward thrust on the balcony rollers and to provide a rigid base for the carriages, piers are fixed to the underside of the balcony ring. These piers usually consist of channel or joist sections extending the full depth of the tank side plates to which they are securely bolted. On the smaller holders, steel brackets formed of angles and plates are sometimes used to stiffen the upper tiers of tank plates. Fig. 19 (*a*) (*b*) illustrates both types of tank stiffeners.

Now it will be observed that the vertical loads which are transmitted to the top of each pier will be represented by the loading system [x_4]. In order to ascertain the maximum value of the safe stress in the tank side plates and piers, it is necessary to consider the load x_4 as distributed over the cross-section of the plates and pier in one bay (B) of the tank. Then as the downward thrust on the tank balcony carriages is the more unfavourable direction of loading, the maximum safe load on the section of the tank bay B may be conveniently stated as follows:

$$L_1 = L \Big/ \left(1 + \frac{ec}{g^2}\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (45)$$

where L = the safe concentric load on the equivalent cross-section—see fig. 19 (*c*),
e = the eccentricity of loading from neutral axis of section,
c = the distance of the inside edge of the section from the neutral axis,
g = the radius of gyration of the section of the tank bay B.
L_1 = the maximum safe compressive load (for eccentric loading).

When obtaining the safe concentric load L it is permissible to treat the side of the tank with pier included in width B as a column with ends "free" and capable of bending in one direction only, radially with the tank. In addition to the downward thrust on the tank side plates, a bursting load is also induced owing to the overhang of the tank rollers. This load reaches its maximum value at a distance of about $d/4$ to $d/2$ from the top of the tank. If the vertical stresses in the tank sides are kept low, this bursting tendency is very small and need not be considered.

(*To be concluded.*)

NOTES ON PLANT AND PROCESSES

Turners' Trafford Tiles.

A newly published brochure by Asbestos Cement Building Products, Ltd., of Trafford Park, Manchester, contains a number of reproductions of photographs showing interesting examples of roofs covered with the firm's "Turners' Trafford Tiles."

The examples show the wide variety of types of buildings—the private garage and the super 'bus station, the small factory and the vast industrial building.

From these it will be seen that "Turners' Trafford Tiles" conform admirably to the requirements of many forms of architectural design, at home and abroad. On the score of weather protection, this form of roofing is claimed to be unrivalled, while the economy of the method renders it suitable for the roofing of all sizes of buildings.

Cast-Iron Roads.

The Stanton Ironworks Company, Ltd., near Nottingham, are putting on the market cast-iron road sections which they have developed during the past eighteen months and which they have tried out under heavy commercial traffic conditions at Stanton, West Ham, Islington, and Millwall.

These sections, when laid on a concrete foundation, are intended to meet the difficult conditions encountered in present day road making practice and can be guaranteed to give a permanent roadway with freedom from wear.

Up to the present, granite setts have been largely used for meeting these difficult problems, but the Stanton Road, built up entirely of cast-iron sections, is more durable, while at the same time offering the advantage of being some 20 p.ct. cheaper than roads built of granite setts.

Fifty Years of Service to the Industry.

Reference has on many occasions been made in these columns to the progressive methods of, and to new apparatus frequently placed on the market by, a firm old-established in the Gas Industry—Messrs. Falk, Stadelmann, & Co., Ltd.—and their many friends will be interested to know that this firm has now attained its Jubilee, in commemoration of which an interesting little illustrated brochure has been published.

The foundations of the firm were laid by the late Mr. Saloman Falk, a man of outstanding personality to whose memory the great organization he created remains a living tribute. The inception of the Company's business can be dated to Jan. 16, 1882.

The brochure goes on to trace the growth of the Company from the time when a staff of four occupied premises consisting of two rooms at 36, Basinghall Street, to the present establishment with premises exceeding half-a-million sq. ft. of floor space and employing, with its subsidiaries, over 2500 people.

Mention is made of the introduction of the "Veritas" gas mantle in 1902, and to the erection of the Wandsworth mantle factory in 1919, covering as it does an area of seven acres and turning out several millions of mantles a year. The general policy and activities of the Company are reviewed, while a number of excellent photographs illustrate many of the firm's provincial premises, in addition to the London offices.

The happy nature of the Company's relations with its managers, chiefs of staff, and all its employees during its 50 years of service is looked back upon by the Directors as something of which they may justly be proud, and they feel that by consistent adhesion to tradition, they may with confidence, bend their energies and look forward to similar successful progress during the oncoming years.

BRITISH INDUSTRIES FAIR, 1932

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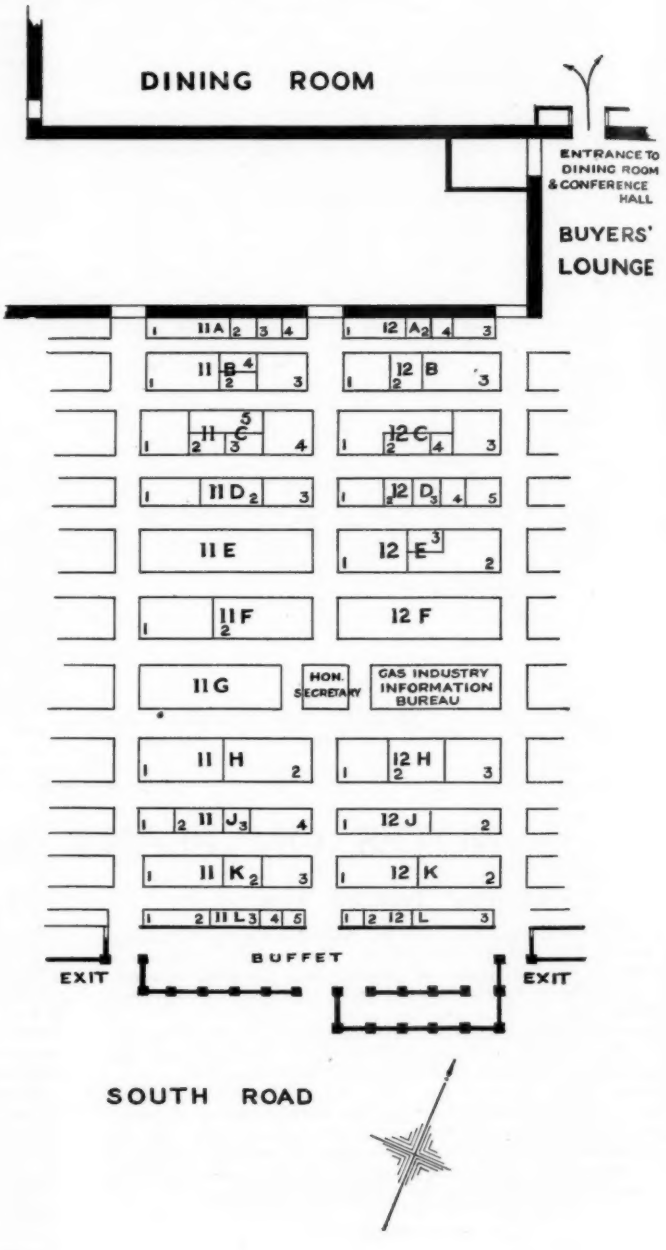


PLAN OF THE STANDS

WITH NAMES AND POSITIONS OF EXHIBITORS

An Illustrated description of the exhibits will be published in a Special Number of the "JOURNAL" next week.

British Industries Fair

Official Visits, Conferences, and Lunches

We publish below a preliminary list which has been issued of official visits, conference lunches, &c., of various trade societies and associations, which are to take place during the whole period of the British Industries Fair at Birmingham, Feb. 22 to March 4

	Location.
FRIDAY, FEB. 19.	
Official Press View—12 o'clock noon	,,
MONDAY, FEB. 22.	
Official Opening Lunch	Bradford Room
TUESDAY, FEB. 23.	
Association of British Chambers of Commerce	Royal Room
Visit of Lord Mayors, Lord Provosts, Provosts, and Mayors of Municipalities of the United Kingdom	Bradford Room
Electrical Association for Women	Royal Room
WEDNESDAY, FEB. 24.	
Electrical Contractors' Association	Royal Room
Electrical Contractors' Association of Scotland	,, ,,
Association of Consulting Engineers	,, ,,
Association of Supervising Electrical Engineers	,, ,,
Illuminating Engineering Society	,, ,,
Municipal Tramways and Transport Association	,, ,,
Tramways and Light Railways Association	,, ,,
Institution of Mechanical Engineers	Bradford Room
British Engineers' Association	,, ,,
Gun Makers' Association (Inc. 1912), Ltd.	Small Committee Room
THURSDAY, FEB. 25.	
Visit of H.R.H. Prince of Wales	,,
Ironmongers' Federated Association Inc.	Royal Room
British Junior Gas Association	Bradford Room
Incorporated Sales Managers' Association	Boulton Room
FRIDAY, FEB. 26.	
Institute of Quarrying	Royal Room
Association of Mining Electrical Engineers	,, ,,
British Gas Salesmen's Circles	Bradford Room
Visit of Members of the Birmingham City Council	,, ,,
SATURDAY, FEB. 27.	
Electrical Power Engineers' Association	Royal Room
Institution of Electrical Engineers—Students' Section, South Midland Centre	,, ,,
SUNDAY, FEB. 28.	
Service at the Parish Church of Birmingham, St. Martin's, Bull Ring, at 10.45 a.m. Preacher: The Most Rev. The Lord Archbishop of York	,,
MONDAY, FEB. 29.	
Birmingham Chamber of Commerce Banquet	Grand Hotel
M.P.s and Bankers	Bradford Room
Engineering and Allied Employers' Association (Birmingham, Wolverhampton, and Staffs. District)	,, ,,
Coventry District Engineering Employers' Association	,, ,,
London Advisory Committee	,, ,,
Institute of Metals	,, ,,
TUESDAY, MARCH 1.	
British Cast Iron Research Association	Royal Room
Institute of British Foundrymen	,, ,,
National Association of Clay Work Managers	,, ,,
National Federation of Building Trade Employers	Bradford Room
Midland Home Grown Timber Merchants' Association	,, ,,
National Federation of Builders' Merchants	,, ,,
National Federation of House Builders	,, ,,
National Association of Heating, Ventilating, and Domestic Engineers	,, ,,
Institution of Structural Engineers	,, ,,
National Hardware Association	,, ,,
Machine Tool Trade	Small Committee Room
South Staffs. and Warwickshire Institute of Mining Engineers	Royal Room
WEDNESDAY, MARCH 2.	
Institute of Electrical Engineers	Royal Room
Incorporated Municipal Electrical Association	,, ,,
British Electrical Development Association	,, ,,
Incorporated Association of Electric Power Companies	,, ,,
Provincial Electric Supply Association	,, ,,
Electrical Wholesalers' Federation	,, ,,
Electrical Merchants' and Manufacturers' Association	,, ,,
London Electricity Supply Association	,, ,,
British Electrical and Allied Manufacturers' Association	,, ,,
B.E.D.A. Dinner in the Evening	Queen's Hotel
Society of British Gas Industries	Bradford Room
British Commercial Gas Association	,, ,,
National Gas Council	,, ,,
Junior Chambers of Commerce	,, ,,
Ironmongers' Federated Association	Boulton Room
Institution of Gas Engineers	Bradford Room
New Comen Society	Small Committee Room
THURSDAY, MARCH 3.	
Institution of Municipal and County Engineers	Royal Room
Birmingham and District Association of the Institution of Civil Engineers	,, ,,
Incorporated Association of Retail Distributors	Bradford Room
National Chamber of Trade	,, ,,
Birmingham Consular Association	,, ,,
London Merchants	,, ,,
Birmingham Merchants	,, ,,
Birmingham Hardware Factors	,, ,,
Electrical Wholesalers' Federation	,, ,,

Gas at Castle Bromwich.

The Gas Industries Section at the British Industries Fair, Castle Bromwich, will be recognizable by the striking green and yellow colour scheme which is being used on all the stands. This section covers an area of 41,000 sq. ft., and the exhibits range from the smallest taps and nuts to scale models of gigantic gasholders; from tiny gas lights for the nursery to the most powerful street lamp such as is used in Whitehall and Regent Street, and in Victoria Square, Birmingham; and cooking apparatus from a central range for a modern super-hotel down to a boiling ring.

Mr. R. J. Rogers, Hon. Secretary of the Gas Industries Section, states that gas is being used for heating, cooking, and lighting at Castle Bromwich. "The total gas consumption for the 1931 Fair was 5 million c.ft.," he said. "We anticipate that the consumption this year will be at least as much. About a hundred and sixty 1000 candle-power high-pressure gas lamps are to be used for overhead lighting in the Fair. In addition, about three hundred gas pendants and lamps will be used over individual stands and in the various kitchens.

"Sixty boilers, circulators, and other gas-heated hot water appliances will be used in the various kitchens and cloakrooms. One hundred and thirty gas fires will be used to warm the dining rooms, conference halls, executive offices, and cloakrooms."

The daily demand for meals last year was so great as to necessitate the building of a new kitchen in time for the opening of the 1932 Fair, and this year there will be six kitchens serving visitors. The new kitchen has 32 gas appliances, including gas cookers and wash coppers, and altogether there are 120 pieces of gas-heated cooking apparatus in the kitchens.

Ceremonies and Functions.

There is no formal opening ceremony in any section of the Fair. Business begins as soon as the doors are opened. The opening will be celebrated as usual by a Government Banquet at the Mansion House, London (by permission of the Lord Mayor), on the night of the opening day, Feb. 22, when H.R.H. the Duke of York will be the principal speaker, with the President of the Board of Trade in the chair. The Lord Mayor of Birmingham will be present at Castle Bromwich on the opening day.

Royal visits are expected as follows: H.R.H. the Duchess of York at the White City on Monday, Feb. 22; H.M. the Queen at Olympia on the mornings of Tuesday, Feb. 23, and Wednesday, Feb. 24; H.R.H. the Prince of Wales at Castle Bromwich on the afternoon of Thursday, Feb. 25; H.M. the Queen at the White City on Friday, Feb. 26.

The Lord Mayor and Sheriffs will visit Olympia and the White City on Tuesday, March 1.

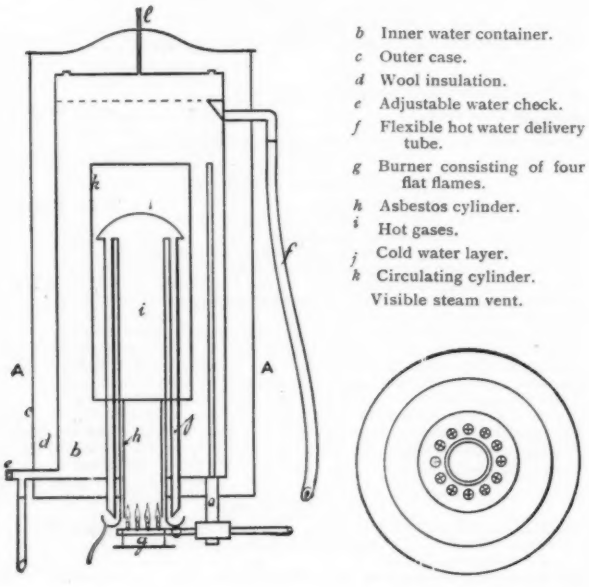
The arrangement of the various sections, the approximate numbers of exhibitors and stand areas occupied will be as follows:

—	Exhibitors.	Stand Area. Sq. Ft.
London Section—		
Olympia (lighter trades and Empire exhibits)	1150	306,000
White City (textiles and clothing)	130	80,000
Birmingham Section—		
Castle Bromwich (hardware, house equipment, and engineering)	1025	243,000
Totals for 1932	2305	629,000

HOT WATER FOR THE : ARTISAN'S HOUSE :

Mr. C. Harris, Engineer, Manager, and Secretary to the Taunton Gas Light and Coke Company, accedes to a request to outline his scheme for securing greater business in the field of water heating

There are many excellent types of hot water apparatus, heated by gas, on the market suitable for those who can afford to spend, say, 3s. to 4s. per week for a supply of hot water; but even here gas water heating has not made nearly the progress it should make. In the vastly greater number of working-class homes where not more than 1s. or 1s. 6d. per week can possibly be spared for hot water supply, and where there is no bathroom, the ordinary gas cooker is called upon to serve the purpose as well as it can.



True, the gas copper can supply hot water for the occasional bath, but only at an efficiency of a little over 50 p.ct., and it is not suitable for economically storing water, for, having a top flue, there is a constant circulation of cold air round the water vessel, which cools the water.

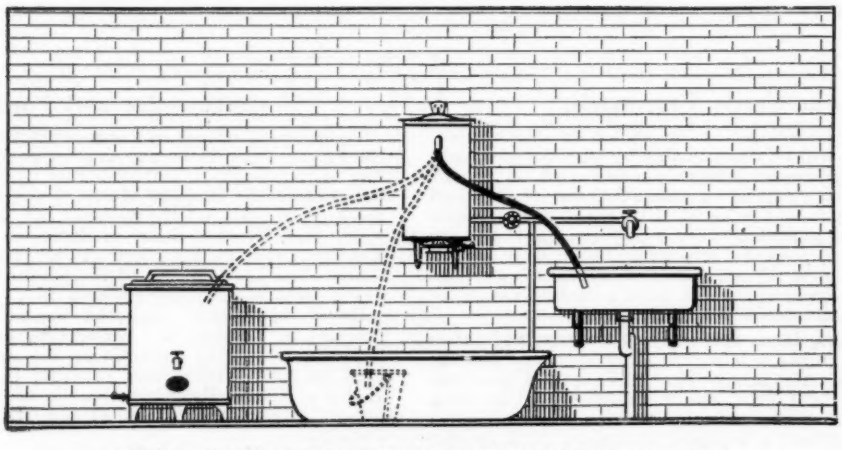
Again, we have the small storage heater of, say, 2 gallons capacity, fitted over the scullery sink, which is an extremely useful article and partially fulfils the need of constant hot water. The heating efficiency of this has been recently improved, but the maintenance consumption is usually 1½ to 1¾ c.ft. per hour. Many enterprising gas undertakings have pushed the fixing of these appliances with advantage both to themselves and their consumers; and when the consumer, if he should have a bathroom, can also afford a geyser, he is fairly well and economically catered for. A low-consumption appliance after the type of the electric storage heater is the most desirable from the gas companies' point of view, and such appliances are marketed by the various makers down to a capacity as low as 12 gallons. The price, however, is too high to enable the gas undertaking to fix on loan in the ordinary prepayment meter consumer's home and the maintenance consumption at 2 c.ft. or so per hour is too high for this class of consumer.

After prolonged thought and experiment in various directions, we, in collaboration with Messrs. T. G. Blood, Ltd., of Birmingham, have had a heater made as shown by the accompanying diagrammatic sketches. We are expecting to have 500 of these fixed in our area during the first year; 150 have been fixed in the last ten weeks, and if we can get an extra consumption of at least 1½d. per day, or 45s. per year, from each of these appliances, we shall be ready to continue our policy of hiring them to our ordinary consumers at 2s. 6d. rental per quarter, fixed free, or on loan to our prepayment meter consumers, charging £1 for fixing, payable if desired out of the slot meter rebate.

Where the consumer purchases the appliance outright at £5 fixed or on hire-purchase, he has the advantage of the special price for gas for water heating.

The 5-gallon size was fixed upon as being the smallest that could supply a bath and thus fulfil all demands in the artisan home, and also as being suitable for scullery use in the wealthier home.

If the thermostat is fixed at 205° Fahr., 5 gallons of hot water can be mixed with 10 gallons of cold water, giving a 15-gallon bath, which is quite enough for the ordinary galvanized portable bath usually used in homes with no bathrooms.



STORAGE HEATER FITTED FOR BATH, WASH-COPPER, AND SINK.

In the newer houses with a bathroom we are fixing the same heater with a stand, but in the 10-gallon size, at £8 fixed or twelve quarterly payments of 15s.; and this, fitted with a ball valve, can supply the whole hot water needs of the modern small home very economically.

From the diagram it will be seen that the heater is well insulated with about 2 in. of wool, and it requires under

1 c.ft. of gas per hour to maintain its temperature. The thermostat is of Messrs. Sperryn's manufacture and is usually set at about 140° Fahr., but when a bath is required it is moved to 200°-210° Fahr.

The heating unit is its distinctive point, and is designed to give a fairly rapid and very efficient heating, and at the same time to give perfect combustion of the gas with a scrubbing of the waste products in the water of condensation, which largely removes any sulphur-dioxide in them, for when the heater is first lighted there is almost total condensation of the steam in the products of combustion (the efficiency on the gross calorific value at this stage being well over 90 p.ct.).

The heater unit and condensation trough are of metal not attacked by dilute sulphuric acid.

The large inner tube has an asbestos cylinder inserted as shown in order to prevent any heat being imparted to the bottom layer of water in the cylinder and also to keep the central column of gases as hot and light as possible.

The twelve ¾-in. diameter tubes are of gilled cross-section —thus ⊕—and a very large surface is exposed to the descending waste gases, which become speedily cooled and correspondingly denser; and the difference in weight of the two columns gives an ample draught. The burners will burn 20 c.ft. of gas per hour with perfect combustion, and the issuing gases are often below 100° Fahr.

There is thus hardly any heat left in the waste gases leaving the apparatus. The inner circulating cylinder was found necessary in order to keep the bulk of the water at an even temperature, for without this the water at the top of the cylinder boiled while the bottom water remained cold.

To keep the heater highly efficient, the bottom 4 or 5 inches of water is arranged to keep cool as long as possible, so that the issuing burnt gases are always thoroughly cooled. For this purpose the inner "invar" steel rod of the thermostat is replaced in this portion of the thermostat by a brass rod, so that it is only the temperature of the water in the circulating jacket portion of the heater which operates the thermostat.

For soft water districts such as ours, the incorrodible heating unit is at present being made of lead or a compound of lead autogenously welded, but for hard water districts, where much deposit is expected, the unit will be of a different acid-resisting metal, and it is also being made in a readily detachable form for cleaning without disturbing any connections.

The interior of the 5-gallon heater is itself, however, fairly easily accessible for cleaning purposes without dismantling. We ourselves are confident that the problem of cheap water heating for the consumer and a lucrative gas load for ourselves has been solved by this heater, and even in the poorest homes we have had no complaints that it is too expensive for them to use.

An interesting commentary is that our own staff and fitters who have installed them are its keenest advocates, and it now appears that for efficiency we have come to bottom-flued water heaters as well as cookers, which thereby obviate the wasteful cooling effect of a draught through the heater when the flame is burning low. We find it preferable to have ⅝-in. bore rubber compound heat resisting hose for the overflow pipe, as this can swiftly be transferred from over the kitchen sink to fill a bucket or a portable galvanized bath or a gas copper. It is much cheaper to heat the water here than in the copper, besides giving a quick second boiling.

Our previous instructions to our canvassers and salesmen have been to be very careful in recommending the various types of water heating apparatus save to the right type of consumer. We now feel, however, that we have a type of apparatus giving almost as universal an appeal as the gas cooker, and in a very few years we hope to have gas water heating almost as general as gas cooking among our customers.

As far as we can at present judge we shall get an average increased consumption of 1½d. to 2d. per day from our consumers where these heaters are fixed—say £2 10s. per year. As our present income is £5 per slot consumer, this represents a 50 p.ct. increase in sales.

Those of our consumers who have installed the heaters are so enthusiastic in their praise that canvassing for their installation becomes so easy a task that we have to restrict it, to prevent ourselves being snowed under with applications at a rate faster than we can cope with them.

Messrs. Blood are also manufacturing an ingenious combination of a volumetric governor and safety cut-off. This both automatically regulates the supply of gas to the heater when burning and cuts off the supply of gas if the valve on the slot meter closes and the gas pressure falls. This makes the heater self-regulating, safe, and foolproof.

Tree Grows Through House

Through the kitchen of a house at Halton, Leeds, grows a fine old beech tree, the trunk of which is seen on the left. When the kitchen was added to the house it was decided to build round the tree rather than sacrifice it. Though the tree constitutes an unusual feature of a kitchen, the same cannot be said of the gas cooker seen on the right of the photograph. The cooker is a "Eureka" by John Wright & Co.

THE "JOURNAL" TECHNICAL RECORD

Which contains Reports of Meetings of Gas and Allied Associations

Institute of Fuel

PRESENTATION OF THE MELCHETT MEDAL AND MELCHETT LECTURE

The Melchett Medal for the year 1931 (the second to be awarded) of the Institute of Fuel was presented on Monday, Feb. 1, to Prof. W. A. Bone, F.R.S. (Head of the Department of Fuel Technology at the Imperial College of Science), who subsequently delivered a lecture entitled "A Century of Fuel Economy," in the course of which he traced the progress made in this direction in connection with the manufacture of iron and steel, gas and coke, and power production. The presentation was made by the President of the Institute (Sir Hugo Hirst, Bart.) at a meeting held in the lecture hall of the Institution of Electrical Engineers; and later Prof. Bone was the guest of the Institute at a dinner held at the Connaught Rooms, Great Queen Street, W.C. 2.

The Melchett Medal was instituted by the Founder-President of the Institute of Fuel, the first Lord Melchett, who offered sufficient money to found the Medal in perpetuity. It is awarded annually—in accordance with the conditions laid down by the late Lord Melchett—to such person, whether a member of the Institute or otherwise, as in the opinion of the Council has done either original research or professional, administrative, or constructive work of an outstanding character, involving the scientific preparation or use of fuel, provided the results of such work have been made available within recent date for the benefit of the community. The award is made without restriction as to the nationality of the recipient.

Sir Hugo Hirst, before making the presentation, paid a tribute to the late Lord Melchett. Everyone present at the meeting would regret, he said, that providence had deprived them of the opportunity of seeing the Medal presented by the great man responsible for its foundation, who had taken so much pains and trouble in the creation of the Institute of Fuel. His knowledge of chemistry, of physics, of natural history, of industry, of politics, and of social work was such that his words would have been picked up by all as precious jewels. He was missed by the Institute to a greater extent than could be expressed, and he was missed by the country as a whole. At this time, which future historians would perhaps describe as the crisis of the British Empire in the twentieth century, no man could have expressed the situation more clearly, and no man could have been more helpful than he in diagnosing it and advising the powers that be.

Prof. Bone, he continued, had by his work fulfilled to 100 p.ct. the specification that the recipient of the Melchett Medal should fulfil. At college he was soon picked out by the late Prof. Dixon to help him in his researches on gaseous explosions, and then he had been concerned with mathematics, physics, mineralogy, and so on. No wonder he had been selected to start the Fuel Department at the University of Leeds; that within a few years he had been awarded the Howard Potts Medal; and that the Imperial College of Science and Technology had selected him to start the Department of Fuel Technology there—a Department which he had directed for twenty years. His work on the chemistry of fuel, gaseous explosions, blast furnace reactions, and allied subjects had brought him eminence and had stamped him as one of the men of whom England was proud—one of the great men of science who, in a most altruistic manner, had wrested secrets from nature and placed them at the disposal of industry and trade for the benefit of the community at large.

Referring to the Melchett Lecture which Prof. Bone had prepared, he said it was a most wonderful exposition of the history of fuel developments during the past hundred years, presented in such a manner that the layman could understand it.

FROM THE MELCHETT LECTURE.

By Prof. W. A. Bone, F.R.S.

I think the past century's progress of the Gas Industry is fairly epitomized in the following table, which has been compiled partly from Frederick Accum's data and partly from those kindly furnished me by Mr. Thomas Hardie and others; it represents average daily works results, and not those of special efficiency trials.

A Century's Progress.

Year of Period.	Type of Retort.	Approx. Carbonizing Temperature, °C.	Gas Yield, C.Ft. per Ton.	Gas Quality, B.Th.U. per C.Ft.	Percentage Fuel Used for Carbonizing.
1819 1830	Horizontal Iron	*Circa* 600	6,000–7,000	Probably 700–750	25
1860	Horizontal Iron	550	6,000	720	15
	Fireclay	800	8,000	660	20
	Fireclay	900	9,600	650	
1910	Horizontal Fireclay	1000	12,000	550	15
1930	Horizontal Steamed		13,800	530	13
	Vertical		16,000	500	10

THE COKING INDUSTRY.

Since coking coals differ materially in the proportions of coke, gas, and bye-products which they yield on complete carbonization, it is necessary, in estimating progress, to refer data to some standard coal, which for my present purpose is a typical Durham coking coal yielding about 27 p.ct. of "volatiles." A century's progressive economy in coking such a coal may be fairly summarized somewhat as in the following table, which should be regarded as approximate only.

A Century's Progress in Coke Manufacture.

Type of Oven.	Beehive Ovens.		Rectangular Chamber Ovens.			
	Old 1830.	Improved 1865.	Waste Heat 1873.	Recuperative Waste Heat 1882-90.	Regenerative. Pre-war.	Regenerative. Post-war.
Approx. percentage coke yield	60	70	72	72	72	72
Waste heat recovered. Therms per ton of coal	*Nil*	15	20	15	*Nil*	*Nil*
Therms per ton of coal in debenzolized surplus gas	*Nil*	*Nil*	*Nil*	10 to 75	25	30 to 35
Recovery of bye-products p.c. of coal	None		Usually none	3·85 anhydrous tar 0·95 crude benzole 1·15 ammonium sulphate		

SUMMARY OF THE CENTURY'S PROGRESS.

Although any estimate of the present-day value of the fuel economy achieved by coal carbonization as a whole, as the result of a century's progress, must necessarily be very approximate, yet I think that some idea of the order of the gain to Great Britain may be obtained by some such comparison as the following, selecting the period 1830-1929 because of the decline in the manufacture of metallurgical coke since 1929 owing to the recent slump in iron smelting.

(1) *Gas Manufacture.*—(*a*) According to Board of Trade returns, in 1929 the 771 authorized gas undertakings in Great Britain, with a total capital of £150,000,000, made 305,471 million c.ft. of gas (of which 292,598 million c.ft. were sold to 9,138,000 consumers), nearly 1 million tons of tar, and 12 million tons of coke by carbonizing 17·9 million tons of coal. In doing so they also used about 0·21 million tons of oil (=0·3 million tons of coal) in the process, and

the *net* coke output, after deducting that consumed in the settings and for making the water gas which was added to the coal gas, would be approximately 8·6 million tons. (*b*) If gas containing the same number of heat units had been made by the carbonizing methods of 1830, some 29·1 million tons of coal would have had to be used, yielding 1·6 million tons of tar and 20·3 million tons of coke, of which about 7·3 million tons would have been used to heat the settings. The saving effected in the coal actually carbonized as the result of the century's progress would thus seem to have been about 11·2 million tons per annum, against which, however, must be set a loss of some 0·6 million tons of tar and 4·4 million tons of coke, as well as the coal equivalent (=0·3 million tons of the oil actually used in 1929). In coal values the *net* gain would probably be something of the order of 6 million tons of coal per annum. Moreover, whereas in 1829 Londoners were charged at the rate of about 2s. per therm for their gas, a century later they got it for 8·6d. per therm.

(2) *Coke Manufacture.*—In 1929 as nearly as possible 20 million tons of coal were carbonized in the cokeries of Great Britain—namely, 19 million tons in bye-product recovery ovens and about 1 million tons in beehive ovens; the total coke yield was as nearly as possible 14 million tons, and in addition thereto some 0·67 million tons of tar, 0·18 million tons (=50 million gallons) of crude benzole, *plus* a vast amount of surplus gas (probably not less than 50,000 million c.ft.) resulted. Had the whole of this coke been made in 1830-beehive ovens, 23·5 million tons of coal would have had to be carbonized without any bye-products or surplus gas resulting. Therefore the measure of the annual gains accruing from a century's progress would be approximately 3·5 million tons of coal *plus* all the aforesaid bye-products and surplus gas.

(3) *Adding* (1) *and* (2) *together*, the total net annual gain may be put down as of the order of 10 million tons of coal, *plus* some 50 million gallons of crude benzole and about 50,000 million c.ft. of coal gas.

THE DINNER.

Sir Hugo Hirst presided at the dinner at the Connaught Rooms to do honour to Prof. Bone. Lady Hirst was also present, and other distinguished ladies and gentlemen included Sir Philip Dawson, M.A., M.P., and Lady Dawson, Sir William Larke (Director, National Federation of Iron and Steel Manufacturers), Mr. H. T. Tizard (Rector, Imperial College of Science and Technology), Dr. F. S. Sinnatt (Director, H.M. Fuel Research Station), Dr. R. Lessing, Dr. W. R. and Mrs. Ormandy, Mr. P. J. Hannon, M.P., and Mrs. Hannon, Mr. Th mas Hardie (Chief Engineer, Gas Light and Coke Company), Mr. H. Hollings (Chief Gas Chemist, Gas Light and Coke Company), Mr. E. C. Evans (National Federation of Iron and Steel Manufacturers) and Mrs. Evans, and Mr. P. C. Pope (Secretary of the Institute of Fuel).

The PRESIDENT, proposing the health of Prof. Bone, said he was proud of the honour of presenting the Melchett Medal, and proud to be able to express to Prof. Bone how much the Institute of Fuel and the country as a whole appreciated his great and magnificent efforts in connection with fuel problems. Such work was more important to the welfare of this country than were any political remedies, and it was to men such as Prof. Bone that we looked for real salvation.

Sir WILLIAM LARKE (Director, National Federation of Iron and Steel Manufacturers), supporting the toast, expressed the gratitude of the iron and steel industry to Prof. Bone for his fundamental investigations of the reactions in blast furnaces, which work he had undertaken as a labour of love, and which would have a great effect ultimately on the general efficiency of the industry. He had been doing that work for the past six years, and was carrying on. At the beginning he had realized that there was probably 10 years' work in it, but, nothing daunted, he had undertaken it, and in a purely honorary capacity. It was frequently the fate of men who devoted their lives to fundamental science that they did not reap material reward; their reward lay in the success of their endeavours to extend and expand the horizon of knowledge. Those who had worked with him knew that he had that great gift of inspiring others to the highest endeavour of which they were capable, and when a man realized that he could do, and had done, that he had probably accomplished more than had those who had achieved material success or even great success in practical affairs. But the fundamentalist never attained proper and full recognition, or hardly ever, during his own lifetime. He was naturally against authority—authority being the accepted form of knowledge—and was always trying to prove that existing knowledge was wrong; it was only thus that he led us along the path of progress. It was to the unselfish labours of men such as Prof. Bone that the true progress and welfare of humanity was due. In honouring him, the Institute of Fuel honoured itself.

The toast was received with enthusiasm.

Prof. BONE, in his response, recalled his early connections with the Cleveland district, of which he was a native, and said that he ought not to have been a Professor—probably Mr. Tizard, the Rector of the Imperial College of Science, would agree. [Laughter.] He had attended school at Middlesbrough at the time when Gilchrist and Thomas were putting the finishing touches to the basic Bessemer steel work process. In 1888 he had gone to Manchester to receive training in chemistry and allied sciences in order that he might enter the iron and steel industry. As the result of his interest in the properties of carbonic oxide, and also as the result of the influence of Prof. Dixon, he had been diverted to scientific research. Though he had not entered the iron and steel industry, he had maintained for many years—until the death of his uncle, the late T. C. Hutchinson, in 1918—a very close connection with the developments in the utilization of blast furnace gas from the point of view of fuel economy. The steel industry had made great progress during the last thirty years, more particularly in the utilization of that really wonderful gas, which was produced by the blast furnace in such prolific quantities; and the secret of the economic production of steel was largely bound up with those efforts. As one whose privilege it had been for many years to train the rising generation of fuel technologists, he expressed his great faith in the rising generation. He had seen many young men passing through the colleges and universities and entering industry in the spirit of service, and with a scientific training behind them which would enable them to render great and efficient services to our industries. The spirit infused into those who studied science, and the spirit of service in which scientifically trained men entered industry, constituted the greatest hope for the future of this country. He regarded the award of the Melchett Medal to him as being a sign that the Institute of Fuel appreciated that fact, and he accepted the Medal, and the congratulations, on behalf of those men.

Sir PHILIP DAWSON, M.A., M.P. (one of the Vice-Presidents of the Institute of Fuel), proposed a toast to Sir Hugo Hirst, and paid a tribute to the success he had achieved in the great electrical undertaking of which he is Chairman—the General Electric Company.

Dr. W. R. ORMANDY, who supported the toast, said there was hope for England when there could be held such a meeting as this, at which politicians—to whom, it had been suggested, the troubles of this weary world were due—proposed the health of a Chairman who was a great industrialist and congratulated a scientist upon his work. [Laughter.]

Sir HUGO HIRST, in his response to the toast, attributed such success as he had achieved to a recognition of his own limitations, as the result of which he had selected good men to help him; it was by team work on the part of commercial, technical, and scientific people that he had been able to build up a concern which could look our foreign competitors in the face. His part might have been a minor one, he might have been fortunate in the personnel with whom he had surrounded himself, but one thing was certain—that the real basis of the success of the undertaking was the scientific basis.

Recent Innovations in Gas Distribution

By J. B. WATT, Adelaide

[From a paper before the Australian Gas Institute]

OIL FILMING OF GASHOLDER.

About two years ago we determined to place a film of oil on the water inside the gasholder, with a view to preventing, if possible, the gas in the holder from absorbing any water vapour. The amount of oil required to form an oil film about $\frac{1}{8}$ in. thick in a holder, with a capacity of $2\frac{1}{4}$ million c.ft., was calculated to be 900 gallons. A quantity of oil "comes to light" during the operation of uncupping, and this oil is periodically skimmed off by the attendant, and conserved in drums to be used in the periodical make up.

The outer lift becomes coated with an oil film which acts as a preservative, but necessitates the introduction of oil to the interior every six months. The yearly loss of oil is approximately 250 gallons, and, at a cost of 4s. per gallon, equals £50 per year (a small sum compared with the advantages enumerated later on).

SYPHONS.

One great advantage which gradually accrued after the oil film had been introduced was the diminished quantity of condensate in the trunk mains' system.

The monthly total dropped from 4000 gallons (previous to filming) to 600 gallons after filming. This drop in the quantity of condensate to be pumped was translated into a monetary saving by the substitution of a small motor truck

(with a 100-gallon tank) for the former large truck and 400-gallon tank; also, the syphon attendant has now the time to inspect all the valves and governor pits on the trunk mains, which was previously carried out by a valve attendant.

The smaller syphons, which number over 4400, are pumped by two attendants who travel on motor cycles, and, owing to the diminished quantity of condensate (also the number of syphons found to be "blowing"), these attendants can complete their duties in the same time as that occupied by the former attendants, four in number, riding bicycles.

The quantity of condensate found in dry meters was the main reason for oil filming being adopted, and it has to be recorded that a great falling off has been noted in the number of water-logged meters passing through the repair department of the meter shop. It is hoped with a drier gas eventually to eliminate this form of trouble with the meters.

The drier gas in the reticulation system has not been a blessing from all points of view, as rust, &c., which previously remained in a moist state in the bottom of the main has now been carried forward with the flow of the gas, and has built up in tees and bends, and so caused considerable trouble. Some two years ago a manual service cleaner was purchased, and it formed the basis of various experiments conducted with a view to the extraction of the rust, &c., from the mains. It was then found that the seat of the trouble was not in the mains but in the inlet services. This caused us to concentrate on various ways and means of clearing choked services without resorting to the cumbersome method of opening up at the connections to the mains.

Mechanized Service Cleaner.

This unit consists of a light car (Austin 7), having an extension added to the outer end of the crankshaft, to which is keyed a toothed wheel engaging a 1 in. wide Morse silent chain. This transmits the power of the engine in the ratio of 1 to 4 to the larger toothed wheel keyed to the second motion shaft.

Brackets fitted with thrust ball bearings carry the second shaft, which finishes in the cab with a cone clutch. This clutch is keyed to the crankshaft of a vertical compressor, and is engaged when required by means of a hand-operated level and pawl attachment.

An air-cooled compressor is bolted to the chassis, and is capable of delivering 14·48 c.ft. of free air per minute at 200 r.p.m. The air is delivered through ¾ in. tubing to an air cylinder fitted behind the cab. This air cylinder, having concave ends, and all seams arc welded, has been tested to 550 lbs. hydraulic pressure, and is fitted with a spring loaded safety valve set to blow off at 300 lbs. pressure. The outlet is controlled by means of a screw-down steam valve, and also a quick release valve.

A 6-ply hose in two lengths of 20 ft. each is carried on brackets, and the ends are fitted with malleable barrel unions for quick attachment. One end is secured to the air cylinder, and to the other end is fixed an ejector.

A pick and shovel, &c., are carried on brackets on the side of the machine, and inside is carried a small kit of fitter's tools. A competent fitter is in charge of the cleaner, and is assisted by a youth who rides on the back portion of the machine.

Choked Inlets.

The procedure adopted for clearing choked inlet services is as follows:

Before leaving the depôt in the morning, the attendant is supplied with a list of "poor supply" services which have been collected from the previous afternoon's list of complaints, and these are placed in order of urgency, consistent with the idea of reducing the travelling mileage to the possible minimum.

On the arrival of the cleaner at the consumer's premises, the engine is left running and the clutch is engaged with the compressor. The attendant satisfies himself that the meter can be disconnected. The cap and lining on the lead connection at the inlet stand pipe of the meter (which is usually situated on the boundary fence) is unscrewed, and the assistant hands the ejector, with hose attached, over the fence: a barrel union on the side of the ejector is engaged with the main cock on top of the riser. A canvas bag is tied on to the outlet of the ejector to prevent the scale and dust from being blown over the garden.

The assistant now opens the screwdown valve on the container, and the attendant opens a quick release valve on the ejector. meanwhile tapping the inlet riser with a hammer. The charge of air (about 24 c.ft. at 250 lbs. pressure) passing through the Venturi tube of the ejector, sets up a vacuum in the inlet service which dislodges most of the obstruction, but a second charge is usually given to ensure a complete clearance.

The quantity of scale, &c., recovered from the canvas bag—*i.e.*, out of each service—varies from 1 oz. to 3 lbs., and the length of time occupied on the operation of clearing an inlet service is about 30 minutes, which is very much quicker than the older method of digging down to the main, disconnecting, and blowing out the service, which took hours to accomplish.

If 30 minutes is allowed for travelling time from one job to another, it will be seen, with a 44-hour week in vogue, that the weekly average is 44 cleared inlets, while the distance travelled for an average week is 150 miles.

Choked Outlets.

The duty of the attendant, after re-connecting the meter, is to assure himself that the pressure is good at the various appliances on the premises, but, should he find the pressure inadequate, he then informs the consumer of the fact and offers to clear the outlet service (which is the property of the consumer) for a nominal charge. Should the consumer agree to this course and sign an order, the attendant immediately proceeds to clear the outlet service.

After disconnecting the outlet side of the meter, the ejector is screwed on to the riser, and the canvas bag attached, the taps of appliances having been turned on by the assistant, and whenever the gauge shows 250 lbs. pressure, the engine is shut off; the air is now released through the quick release valve into the ejector, which sucks all the dust and scale from the furthermost point of the service.

The quantity of dust recovered varies according to the length and age of the outlet service, but an average 50 ft. outlet would yield about 1 lb. weight of scale and dust. The vacuum gauge shows a mean of 15 in. mercury on two "blows" on a 50 ft. outlet. The number of "blows" required to clear outlet services varies considerably, but an average of two "blows" seems fair, which also governs the time that the gas is turned off; such time is about 20 minutes.

After the attendant has satisfied himself that the outlet is quite clear, he then connects up the meter and purges the service at the most distant plug. He then tries the appliances for pressure and good combustion, and makes any slight adjustments that he finds necessary. Two mechanical service cleaners are employed to serve the total distribution area, while one spare unit is kept in readiness at the depôt. The hours worked by the attendant are from 8.15 a.m. to 5 p.m.

Advantages obtained by using mechanical means of clearing inlet and outlet services are as follows:

Inlets.

- Much quicker service.
- Less inconvenience to consumer.
- Less waste of gas during clearing operation.
- No reinstatement of roads or footpaths.
- The cost to the Company has been reduced to ⅛th of the former cost.

Outlets.

- Much quicker service.
- Less inconvenience to consumer.
- The gas is turned off for 20 minutes instead of, say, 3 hours.
- The service is thoroughly cleared.
- No digging up garden paths and reinstatement of same.
- A 50 p.ct. reduction in cost to the consumer.

Oil Spraying Steel Mains.

An endeavour to prevent the formation of rust in steel mains has been tried by spraying the tubes with hot boiled linseed oil (before laying), and a few notes on the method adopted may not be amiss.

The tubes are placed on trestles and carefully cleared out by passing a spiral wire brush (with a rope attached to either end) through the tube before spraying.

The spray used was a small fuel burner and had ½ in. diameter gas pipes attached, to carry the air and oil to the spray, also enabling the spray to be pushed along the tube for about two-thirds of its length. An air pressure of 40 lbs. was used, and the gravity feed tank was of small dimensions, so that frequent replenishments of hot boiled linseed oil were required. If the oil is kept hot a fine spray is obtained, and the tubes dry with a varnish-like surface in 24 hours.

Actually the oil spraying has only been in operation for about 4 years, so the condition of the tubes after a considerable space of time cannot be given, but over 8 years ago some steel tubes were swabbed out with hot oil, and one of these tubes was recently removed from the line of main, due to a diversion of the main, and it is interesting to note that the oil appears in good preservation in spite of the friction of the gas which has been pumped along this

main at 4 lbs. pressure for over 7 years. The condensate has no effect on the boiled oil coating.

Oiling Service Pipes.

A further effort to combat the rust nuisance is at present being tried out—*i.e.*, the oiling of all service pipes. The tubes are thoroughly cleared of all mill scale, &c., by means of a spiral wire brush, which fits snugly into each size of tube, and is pushed through the tube with a rod attached to it.

The tubes are heated over a long coke fire, and then immersed in a dipping trough partially filled with boiled linseed oil, after which they are hoisted up on end and allowed to drain into a trough until the following day, after which they are removed and stacked in their various sizes.

Of course, the outside of the tube is coated during the operation, which helps to protect it from corrosion.

The cost of oil, labour, and fuel works out at 0·48d. per foot, averaging all sizes from ¾ in. to 2 in., and it is hoped that in time the benefits which will accrue from this oil coating will amply repay the above mentioned cost.

Lock-Bar Steel Mains.

A recent extension of 13 miles of high-pressure trunk main necessitated the use of large steel pipes, and, on account of cost, it was decided to use locally made lock-bar steel pipes. The pipes, 18 in. in diameter, were formed of ¼ in. thick steel plates with special machined edges to engage into the lock-bar, which was pressed together under hydraulic pressure. A standard length of pipe of 28 ft. was agreed upon, and the pipes were tested with an air pressure of 40 lbs. per sq. in. before being coated with bitumen, and, while hot, rolled in fine pit sand.

Previous to this date all welding of steel mains had been carried out with the oxy-acetylene flame, but when this medium was tried to weld on the steel collars to the lock-bar pipe, it was found that the heat necessary to make a weld at the lock-bar caused that portion to expand and to leak along either side of the bar. Arc welding was thereupon tried, and this was found to make a tight welded joint, owing to the fact that the more localized heat of the arc did not give the bar the same opportunity to expand.

Portable arc welding sets were designed to suit our requirements, and have proved advantageous in many directions.

A comparison between oxy welded and arc welded joints on this main are given here:

Per Joint.	Oxy Welding.	Arc Welding.
On bank	74 minutes = 11s. 3d.	33 minutes = 6s. 4d.
In trench	90 ,, = 11s. 10d.	47 ,, = 7s. 10d.

As there were nearly 3000 joints on this 18-in. main, it will be seen that a considerable saving in both time and money was obtained by means of the arc welding.

Before concluding, I would like to mention that we have both low and high pressure systems of distribution, and, although the inlet service of the high-pressure system costs more to install, owing to the necessity of fixing a service governor on the inlet to the meter, this is more than counterbalanced by the lesser number of complaints received from consumers supplied by the high-pressure system, and, from our experience, it is an ideal form of distribution.

Exhausting and Governing Gas from Retorts

Discussion on Paper by Mr. Roy Summerson, of Luton, at the January Meeting of the London and Southern District Junior Gas Association—see last week's "JOURNAL"

The President (Mr. J. H. Goldsmith), opening the discussion, said he was interested in the remarks concerning the "Pontifex" diaphragm recorder, and he thought this type would record oscillations satisfactorily. He referred to the fact that there was a 1-in. seal on the horizontal retorts and a pull of only 5 or 6 tenths. As the plant was in operation so little, this seemed hardly worth considering. The relative velocity of the gas at different points in the foul main was an important point and one which was not given sufficient attention; there were, in fact, very few figures stating what the velocities should be. They must take the temperature of the gas into consideration also; for one could not consider velocities without considering the temperature of the gas as well. Mr. Summerson had shown that the velocity of the gas in the offtake pipes was low compared with that in the foul main. The temperature in the offtake pipes, on the other hand, was, of course, much higher than in the foul main; and one had to allow in the offtake pipes sufficient margin for pitching-up of the pipe. It gave him great pleasure to welcome Mr. Wm. Phillips to their meeting.

Mr. Wm. Phillips (General Manager, Engineer, and Secretary of the Luton Gas Company) referred to the value of the Junior Associations in helping to educate all members of the profession. He had been very pleased when he had heard that Mr. Summerson was to read a paper before their Association. He thought that, after hearing the paper, many of them would be inclined to think that he was a rather inefficient engineer. For instance, there was the foul main decreasing in size when there was an increasing quantity of gas. In this connection it might be of interest to them to know that the original Woodall-Duckham slot retort was worked out successfully at the Luton Gas-Works in 1911; and in those days the efficiency of the "W.-D." retort was not what it was to-day. The installation of the first two beds was put up to produce three-quarters of a million c.ft. of gas a day. At the present time, on about 25 p.ct. greater ground space, they were making nearly two millions; and the smaller foul mains in use were the ones originally put in to cope with the smaller make of gas, while the larger foul main had been added with the newer installation of retorts at a later date. But they were working quite well at Luton—78 to 80 therms per ton of 480 B.Th.U. gas—and so he had not really worried much about his foul mains and governors. He was, however, of the opinion that they certainly needed much more sensitive governors for the control of the gas from their retorts, and he suggested the relay type, though probably even this could be improved upon.

Practice at Reading.

Mr. S. H. Miles (Reading) congratulated the author on his paper, and agreed that this subject had not received all the attention it deserved in the past. There were very little practical data regarding the design of offtakes and foul mains. He inquired of Mr. Summerson if any trouble had been experienced in regard to pitching-up. Referring to the installation at Reading, where there were forty Glover-West retorts, he stated that in each case they had endeavoured to keep the retort house governor as close as possible to the retorts, the greatest distance being 65 ft. from the collecting main. They made it a practice to have liquor sprays close to the inlet of the governor, the liquor being put on twice per shift; they had experienced very little trouble up to the present so far as the governor was concerned. In fact, the only trouble had been in the early days, and this was due solely to the personal element, it being difficult to prevent the foreman from putting on a little extra pull on the retorts when no one was looking. They had experienced a certain amount of pitching-up in the collecting mains as a result of this over-pulling, and he wondered if anything like this had been experienced at Luton.

He went on to speak of various types of governors, remarking that the Woodall-Duckham Company recommended "Drayton," "Arca," or "Askania," and it appeared to him that these governors were more sensitive than the type described in the paper. He was in agreement with the remarks regarding swelling tests, and suggested that, although their knowledge of this subject had been greatly increased, there was still an enormous field for investigation. In regard to the relation between bottom and top pressures in the retort, they had to take into account also the question of plastic layers and so forth. Another important point was in connection with safety provisions in the event of breakdown of the exhauster, and he inquired what method was adopted at Luton. Exhauster breakdowns were unfortunate at any time, but with verticals there was the added danger of the escaping gas taking fire and the intense heat firing the coal in the overhead bunkers.

Mr. J. A. Nichols (Gas Light and Coke Company) said that a governor could not be fitted anywhere, so that the engineer had to decide where he wanted level gauge. In his particular case there was a variation of only about 5-tenths and at the inlet main 5-hundredths. As the pressure went up in the hydraulic main, the vacuum at the inlet of the governor would be broken down in order to counterbalance the vacuum outside. In this way they had obtained satisfactory working results. They had a relay type governor with a butterfly valve of not more than 9 in. in diameter. In this way they could reduce the weight of the valve. At his works they had a light valve weighing 11 lbs.; thus reducing the inertia, and he was of opinion that if this method was followed up better results would be obtained. It seemed to him that at Luton two or three governors would be required instead of one.

Safety Measures for Exhauster Breakdown.

Mr. C. A. Deas (Hertford), referring to Mr. Miles' remarks in regard to breakdown of the exhauster, said that at his works there was a seal which would automatically open in the event of the exhauster pulling up. He thought that what actually affected the volume of gas given off was the rate of carboniza-

tion and not the pull of the exhauster. The exhauster was there merely to remove the gas as it was driven off. In regard to reducing the inner diameter of the governor over the valve, he thought this had been done in the Braddock governor, and since they had installed a Braddock governor they had had better results. He remarked that the oscillation of the governor at Luton seemed to be very severe, but he considered that a governor on the exhauster would overcome this. It would seem that at Luton they were trying to make the governor do two things, and he thought that if they could get the exhauster to maintain a constant pull they were going to give the governor a better chance of maintaining constant pressure conditions at its inlet. In regard to the working of the horizontal bench, a pressure of 9-tenths should not occur when the retorts were first put on. He referred to the fact that at Luton it was their practice to have nine mouthpieces open at the same time, and suggested that it would be better to draw three and charge three. To charge nine retorts out of forty-three would make a big rush of gas. On the question of the 0·9 in. W.G., he asked if this referred to one retort only.

Mr. SUMMERSON: Yes—the one farthest from the governor and therefore the worst.

Continuing, Mr. DEAS said that he thought at first that a great deal of the trouble on the horizontal bench was due to the offtake from the hydraulic main being rather small, but apparently this seemed to be all right, as it was the size they had at Hertford. They found that considerable advantage was derived at Hertford by having the offtake on the top of the hydraulic main instead of at the side. The mains thus had nothing to collect, as everything drained out. There should be no variation from draw to draw with a good governor. In regard to the pressures inside and outside the retorts, there was no doubt that the ideal was equal pressure both inside and out, so that gas could not leak in or out.

Mr. E. R. WILLIS (Gas Light and Coke Company) inquired what type of exhauster Mr. Summerson was working, whether a governor was working on the exhauster itself, and where the exhauster governor connection was positioned. Frequently if the impulse pipe was taken from the inlet of the retort house governor there was a reduction in the fluctuations of the retort house governor itself. It had been suggested, continued Mr. Willis, that when the coke was drawn there was an increased pressure at the bottom of the retort which was also shown at the top of the retort. He presumed that Mr. Summerson used water in the tank of his governor, and in this connection he (the speaker) had experienced considerable corrosion on the bell; he wondered if Mr. Summerson had tried the use of oil with a view to eliminating this. In the event of pressure on the benches, due to exhauster breakdown at his works, they had an efficient blow-off pipe, which would cope with a pressure of short duration.

AN ADEQUATE MAIN.

Mr. R. T. DE GRUCHY, B.Sc. (Gas Light and Coke Company), said that stress had been laid on the adequate size of the foul main between the retort house and the governor. Mr. Summerson had shown considerable pressure variations in his vertical retort foul main. In the horizontal house, where the draw only took place every two hours or so, there were considerable fluctuations in the makes of gas, probably varying from 20 p.ct. above and below the mean gas production. In regard to faults in the ordinary type of retort house governor, the kind he had had to deal with was the diaphragm type with bellows working directly on the butterfly valve. This type was affected by variations, inasmuch as a rush of gas past the valve seemed to have a kinetic effect on the butterfly valves, so that the greater the flow of gas the greater the pressure exerted at the inlet. This had the result of reducing the pull when the make was greatest. Mr. Summerson had said that he could detect no time lag when a long control pipe was utilized, but he was of opinion that there must be some lag. An alteration in the position of the governor bell would necessitate a flow of gas along the control pipe. With a long pipe an appreciable time would therefore elapse while the new position was being taken up, because the differential pressure between the two ends of the control pipe was very little; so that a variable exhauster pull led to unsteadiness in the governor's working and thus to hunting. Another point in connection with the diaphragm type of governor was that there were not the two areas such as in the case of the type mentioned in the paper, and it was quite easy by fitting a small inner seal to have the whole area working on the pressure communicated through the control pipe, and in some cases this worked quite satisfactorily, though there was unsteadiness at times.

FRICTION ON THE GOVERNORS.

Mr. G. H. S. DU PONTET, B.A. (Gas Light and Coke Company), stated that the only difference he had noticed between the bell type of governor and the one mentioned in the paper was the valve.

The first thing that struck him was the extraordinary amount of friction Mr. Summerson experienced in his governors. Apparently he had to put on 3 lbs. before he obtained any appreciable variation in the inlet pull—that is, a weight sufficient theoretically to give a variation in the pull of 0·08 in. Friction alone, he thought, would account for over half this. Mr. Summerson had found 3-tenths of an inch variation, of which friction would account for 0·16 in. Mr. Du Pontet could not help thinking that Mr. Summerson had been rather unlucky in regard to this matter of friction. He had tried pressing down the lever of the governor, and in each case the governor had gone back to exactly the same place as when it was in balance; so that as far as they could tell there was no friction to prevent the governor bell moving up and down. They had this type of governor 100 ft. from the foul main on the retort beds working on the pressure of the gas and giving quite good results in spite of the long distance. They had consulted with the makers of the governor, and they suggested a certain type of inner seal, since the installation of which, they found that the governors would give quite good control of the gas pressure on the beds. The oscillation was of the order of $\frac{1}{4}$ of a tenth, while the variation from draw to draw as passed on to the chart was only about $\frac{1}{2}$ a tenth. And they found this not only with one governor, but with three—all working perfectly well. His experience of the relay type of governor was that it was of very little use putting in one of this type unless the exhausters were working fairly well. At his works they had two exhausters working in parallel, and the oscillation was very severe. The pull from the house was 2 or 3 in., and the results with the relay type of governor were no better than with the bell type. The trouble with the relay type might lie in the butterfly valve. The relay type in his case was worked with anti-dips.

In regard to exhausters, continued Mr. Du Pontet, they had the two-blade type working in parallel, one with a fixed throttle and the other governed by the inlet gas pressure. He would like to hear anyone's opinion on this method of working these governors. Another point was where they should take the impulse from with exhauster governors. They had been working with an impulse pipe of 300 to 400 ft. in length, and they had put in another alternative service going to the gas main on the inlet of the exhausters. If they had a shorter service they would get less oscillation from the exhausters. So great was the oscillation from these two-blade exhausters that it made one want to know about the possibilities regarding the use of turbo-exhausters. Another trouble they had experienced with their exhausters was the blockage of the control pipe with naphthalene. It might be that the trouble was due to a flow of gas passing continuously from the beds to the outlet of the governor.

Mr. G. PERCIVAL (Fuel Research Station) asked if Mr. Summerson had been troubled with water in the pipe connecting the recorder to the bottom casting, when taking bottom pressures at the vertical retorts. It seemed to him that Mr. Summerson's recorder was only working for probably two hours or so, after which it became water-logged.

Mr. NICHOLS stated that with a "Reeson" type of governor they had taken the top casting off and fixed a side to it, thus making it into a tank, to which a bell was fitted as in an ordinary governor operating a butterfly valve—and this was giving satisfactory results. In fact, during shut-down on Sundays the governor kept practically a straight line. If anyone was in a position to put in a new governor on his works, he concluded, there was no doubt that the relay type was the best.

THE AUTHOR'S REPLY.

Mr. SUMMERSON, replying to various points raised by members in the course of the discussion, remarked that it was evident that this subject needed more attention than it had been given in the past. In regard to Mr. Goldsmith's remarks about relative velocity, he said that he had merely worked out the figures in order to obtain a rough idea of the gas velocity, and to see whether the foul mains had been designed to keep the velocity constant. The temperature at the offtake pipes on the vertical retorts was about 250°; there was a temperature drop of 100° between the offtake pipes on the vertical retorts and the inlet of the governor. This would cause a volume contraction of nearly 20 p.ct. After hearing what Mr. Phillips had said they would more readily appreciate why they were somewhat unlucky in regard to the size of their foul mains. When opportunity arose, they hoped to alter them.

He agreed with Mr. Miles that the use of liquor sprays was advisable, and he understood that in their latest installations including relay type governors the Woodall-Duckham Company provided a hot liquor spray on the butterfly valve itself in order to keep it clean. Regarding Mr. Miles' questions as to the best type of relay governor, he had heard the "Askania" very well spoken of. On the question of bottom pressure and conditions inside the retorts, he said there was much work waiting to be done on this subject. He referred them to the article by Dr. G. E. Foxwell in the "JOURNAL" for Jan 13 last (p. 82), in which it was pointed out that the flow of gas appeared to be mainly through the coke and not through the uncarbonized coal.

If the exhausters suddenly stopped at Luton they had three 6-in. pipes fitted to the foul main, which they could open in such an emergency. They had tried reducing the central area of the governor bell (over the valve) by fitting a seal round the valve rod, and thus making sure that the pressure communicated through the control pipe to the outer annular area was acting over the whole of the bell. He agreed that their governor was probably suffering from friction. The trouble with this type of governor was that the power required to move the bell and valve had to be derived from alterations in the gas pressure one was trying to control; in a nearly ideal state, these variations would be very small, and therefore the governor should be extremely sensitive.

The success of the relay type of governor was due to the fact that this slight variation was magnified to operate the valve. His tests proved that it certainly would be necessary to govern the gas at each of the three beds of their vertical retorts. He

agreed that the Braddock governor was a better type than the one described in the paper, though he preferred the relay type.

Oscillation.

On the question of oscillation caused by the exhausters, in the case of the vertical installation they had two exhausters at work, one running at constant speed, with a Pickering type governor, at a slower rate than the other exhauster, which was governed by the ordinary type of hydraulic governor acting on the steam throttle valve. On the horizontal installation there was one exhauster at work of the usual type with a throttle governor close to the inlet. All the exhausters at work during the tests mentioned in the paper were of the two-bladed variety. Mr. Summerson said that he would like to know how to measure oscillation; the "Pontifex" recorder did not give a record of oscillations which could be accepted as entirely accurate.

As to the drawing of the coke affecting the pressure at the verticals, he stated that it certainly affected the bottom pressure, but it was not sufficient to affect the record on the chart on the offtake pipe, and there was no difference on a single retort. But if several retorts were open at the same time one noticed gas puffing out through leaky rodding plugs—though the pressure alteration was not sufficient to be recorded.

They used water in the governors, but had never tried oil. They had a very small flow of water in order to keep it reasonably clean. Nevertheless they experienced a certain amount of corrosion, and had had to renew the bells occasionally. In regard to time lag in the long control pipe, his tests failed to detect any lag at all, and all charts taken agreed. The amount of gas flowing along such a control pipe would be very small; and he did not think that there could be very much time lag.

He mentioned a type of governor which not only governed the butterfly valve but also the speed of the exhauster, and the control of the two was combined in such a manner as to ensure good working of the butterfly valve of the governor itself. In regard to turbo-exhausters, he expected that the coke oven people could tell them a good deal about these, and he thought they were probably only suitable for large works.

In reply to Mr. Percival's remarks, Mr. Summerson said that he did not get any water in the pipes, which fell all the way to the bottom casting, the length of the pipe being about 6 ft. by ½ in. diameter. He could appreciate, however, that one might experience trouble from this source. In the case of the recorder on the offtake pipe of the retort, there was only a distance of about 1 ft. or 18 in. between the offtake and the recorder.

Vote of Thanks.

Mr. H. J. Risby (South Metropolitan Gas Company), in moving a hearty vote of thanks to Mr. Summerson for his paper, said that it characterized the thoroughness with which the members of their Association tackled their work.

Gas Light and Coke Company

ORDINARY GENERAL MEETING

The Ordinary General Meeting of the Proprietors of the Gas Light and Coke Company was held on Friday, Feb. 12, at the Chief Office of the Company, Horseferry Road, Westminster, S.W. 1, Sir David Milne-Watson, LL.D., D.L. (the Governor), presiding.

The Secretary (Mr. W. L. Galbraith) having read the notice convening the meeting,

The corporate seal of the Company was thereafter affixed to the register of holders of capital stocks.

The Governor said: I presume it will be your pleasure, as usual, to take the report and accounts as read.

On turning to the capital account you will find that the Company has raised just under £40,000,000, including premiums, and that there remains to be issued some £4,000,000 of loan capital.

During the year there has been an expenditure of £1,196,000 on capital account—land £216,000, buildings and machinery £413,000, mains and service pipes £322,000, meters £83,000, and stoves £162,000—and we have written off altogether £124,000 for depreciation of ships and stoves. The net capital expenditure, therefore, during the year has been £1,072,000.

There are four reasons for this somewhat heavy expenditure on capital—namely, the purchase of land for future development; the erection of gasholders and other plant; the extension of our mains and service pipes to meet growing requirements, particularly in outlying districts; and the provision of meters and stoves for the ever-increasing number of consumers of gas. All this expenditure, I am sure you will agree with me, is a healthy sign of the Company's vigour.

When we come to the revenue account, I am glad to report that we have had an increase in the sale of gas of almost 1½ p.ct., which, in view of the conditions prevailing to-day, is most satisfactory. I am afraid that most businesses with which you are acquainted unfortunately show decreases, and I feel sure that the shareholders will be gratified that in these difficult times we have been able, not merely to hold our own, but actually to increase our sales.

Increase in Gas Sales.

On the credit side of the account, the revenue from the sale of gas is £8,519,000, showing an increase of £78,000. There are also very satisfactory increases in respect of rentals for appliances. The rental of meters brought in £362,000, an increase of £13,000; the rental of stoves £629,000, an increase of £23,000; and the rental for fittings £526,000, an increase of £11,000. Altogether, the income from gas and rentals is £10,036,000—a total increase of no less than £125,000.

There has been an increase in consumers of no fewer than 27,000 in the year, the total number now approaching 1,400,000, and we have supplied a further 86,000 pieces of gas apparatus during the year.

With regard to coke, there has been a small drop of 4d. per ton in the net amount received, which, together with a decrease in the quantity made, has resulted in a falling off in the revenue of £90,000.

On the other hand, tar and its products have brought in £326,000, which is £6000 more than last year. Ammoniacal liquor shows a loss of £5000, but that, as compared with the loss of £16,000 in the previous year, is £11,000 better. Altogether, the residuals are down by £82,000, against which, however, can be set the increase from gas and rentals mentioned above, giving a net increase of £50,000 on a total income of nearly £12,000,000.

On the other side of the account, coal has cost us slightly more per ton, although the amount spent is less than last year—this being due to the smaller quantity carbonized—and there was a decrease in the expenditure incurred on rates and taxes, due not to a reduction, I am sorry to say, in local rates but to an adjustment for income-tax, otherwise I do not think there are any figures to which it is necessary for me to call your attention.

Allocation of Profits.

The result of the working for the year is, therefore, as follows: The balance transferred from the revenue account to the profit and loss account is £1,953,000, as against £1,809,000 for the previous year. This balance, after adding the sum of £18,000, received from H.M. Treasury in respect of the Development Act, 1929, and after allowing for interest on borrowed money for the year and the dividends distributed in respect of the June half-year, leaves a sum of £820,000, from which to pay dividends for the December half-year.

This enables the Directors to recommend the usual dividends on the 4 p.ct. consolidated preference stock and the 3½ p.ct. maximum stock, and to recommend a dividend at the rate of £5 12s. p.ct. per annum on the ordinary stock.

The payment of these dividends, together with the necessary contribution of £20,000 to the redemption fund in respect of the half-year ending Dec. 31, will absorb £681,000, leaving £139,000 to be carried forward to the credit of the current year's accounts, as against £122,000 carried forward on the last occasion.

During the year, as you all know, the standard rate of income-tax was raised from 4s. 6d. to 5s in the £. From the payment of dividends for the June half-year 4s. 6d. in the £ was deducted, as the increase had not then been made, and to adjust matters for the year it would seem equitable that the deduction from the December half-year dividends should be at the rate of 5s. 6d. in the £. While the last Finance Act, however, permits of this adjustment being made with regard to preference stocks, debenture interest, and other similar charges, it does not allow it in the case of the dividends on ordinary stocks. The next deduction of tax, therefore, on the dividends on the ordinary and maximum stocks of the Company will be at the rate of 5s. in the £, and the Company will have to bear the extra 6d.

Having dealt with the financial results of the year, it would no doubt interest the proprietors if I said something about the Company's business generally.

American Gas Expansion.

Gas as a means of heating and cooking is as popular as ever, and, indeed, is becoming more so. I am not basing my remarks on the experience of this Company or of the Gas Industry in Great Britain alone, for it is gratifying to be able to report that in the United States of America the sale of gas is increasing enormously. In the last ten years the sale of gas in the United States has actually gone up by over 100 p.ct. It is true that the United States is fortunate in having large supplies of natural gas which can be obtained very cheaply, but the fact remains that gas is more than holding its own there, as against other varieties of fuel and power, whether oil or electricity; and it is encouraging to know that this is the case in a country which has such wonderful natural resources, as the United States have, in the form of oil and water power. It is not only, however, in the field of domestic heating and cooking that we are more than holding our own.

The International Illumination Congress, to which I shall refer again later, opened the eyes of the public to the spectacular lighting effects that can be achieved by gas. But it also served as a valuable reminder of the very large number of famous London streets that are lit nightly in the ordinary way of business by our Company. A great part of central London—the City and the West End—and a majority of the boroughs and other districts in our area are lit by gas. Whitehall, Regent Street, Cannon Street, and Queen Victoria Street are what I may call shining examples of this lighting. There can be no question but

that modern gas illumination is the best means of street lighting, both for efficiency and economy.

Over 3000 Industries Using Gas.

There is also a very large and interesting development in the use of gas for industrial purposes. We are constantly putting in new supplies of gas for use in industry, and to-day gas is used in more than 3000 different industries, with an average of seven processes in each industry. This is a most satisfactory feature of our business, as the industrial load is a particularly good one, and we are taking steps to encourage its growth in every possible way.

For many years we have had an Industrial Section at Goswell Road, where apparatus has been designed and constructed for the use of gas in special industrial processes. Recently, however, we felt that it would be better if all work of this description were concentrated at one spot, and, therefore, we have removed our industrial showrooms and workshops to Watson House, which is the centre of our activities with regard to gas appliances. We think this concentration will enable us to give an even better service to industrialists than in the past.

"Cleanglow."

Turning to coke, some interesting developments are now taking place. We have recently put upon the market a new fuel to which we have given the name of "Cleanglow." "Cleanglow" is a specially prepared fuel suitable for burning in open fireplaces. It has been enthusiastically taken up in London as a means of supplying a long-felt want—namely, the provision of a smokeless fuel which can be burnt in open grates. We have come to recognize that, however useful and popular gas fires may be, many householders desire to have at least one open fire in their homes—either in the dining-room or the drawing-room, as the case may be—and in order to meet this special feature of British home life we have set ourselves to supply a smokeless fuel which can be burnt in an open grate, and we believe that we have solved the problem. The grate itself has the advantage of having a gas attachment to ignite the fuel, thus avoiding the bother and dirt caused by lighting the fire with paper and wood. We think there is a great future for this new fuel.

Ordinary coke is increasingly popular for domestic boilers and furnaces, but I feel certain that you will all be glad to hear of this new development, not only as shareholders of the Company but as citizens, believing, as I am sure you do, that there is much to be gained from the point of view of health by the prevention of pollution of the atmosphere of our great cities by the abolition of smoke.

Tar and Benzole.

With regard to tar, it is pleasant to report that during the past year we have sold increasing quantities of tar for road making. Not only in our own opinion, but in the opinion of others best able to judge—namely, experts on motoring—there is no question as to the superiority of tar for making not only good roads but safe roads—roads on which you can travel in fine or wet weather without fear of skidding. As we all know, skidding contributes very largely to the number of accidents on the roads. It is particularly gratifying that the gas and coke oven industries of this country can produce a British material which can make a road which is really first class in every way and capable of taking the heaviest traffic.

Benzole, another of our products, is the only home-produced motor spirit. This year we have made no less than 2¾ million gallons, and we are taking steps at the present time to increase the output to something between 5 and 6 millions. In this way also we are rendering, I feel sure you will agree with me, a service to the country by producing at home a motor fuel which is superior to all other motor spirits.

With regard to sulphate of ammonia, it is sad to have again to report a loss, even though it is less than last year. The position in the sulphate markets is as serious as ever. There is a world-wide over-production of nitrogen, due to the fact that synthetic plants, making nitrogen from the air, have been set up in all the most important countries, and therefore most of the markets which used to take large quantities of our sulphate of ammonia are closed to us. However, at its present price it is to be hoped that farmers in this country will avail themselves of this cheap fertilizer to a greater extent than they have done in the past. The apparent consumption of fertilizer nitrogen in the British Isles is only about 8 lbs. per acre, as against some 18 lbs. in Germany and even more in Belgium and Holland. We all know the difficulties that our farmers have had in the past and are still having to-day, but if the Government, as it has promised, gives assistance to agriculture, let us hope that one of the first things the farmer will do will be to purchase this home-made fertilizer which will return him a handsome profit by increasing the productivity of his land.

Two Acquisitions.

As you are all aware, we have, as from Jan. 1, taken over the Southend-on-Sea and Brentwood Gas Companies. We are looking forward to developing their districts and we believe that in them there is room for great extension in the use of gas. It takes some time, of course, to absorb the new districts completely into our system, but I am glad to report that everything is working most harmoniously, and I feel sure that the officers and men who have come over to us will very soon find themselves quite at home in their new surroundings. Our endeavour will be to give in the new districts the same high standard of service as we do in our old districts, and I am certain that the consumers will have no cause to regret the change-over.

The result of these amalgamations is that the Company now supplies an area well over 500 square miles in extent. We have 15 manufacturing stations and 51 showrooms; there are over 4970 miles of mains in our enlarged district, and we supply gas to 49,000 public lamps; we consume no less than 2¾ million tons of coal and over 17 million gallons of gas oil; and we have a fleet of 17 steamers.

A Vast Organization.

I give these figures because I feel sure that many of you and many of the general public do not realize how vast an organization is the Gas Light and Coke Company. So much has been heard of electricity and oil in the last few years that I think an erroneous impression has grown up that the day of gas is over and that we are a decaying industry. I believe that the figures I have given you will speak for themselves and show that we are one of the greatest public utility industries in the country, and if you except coal, the greatest suppliers of fuel, and we are growing all the time.

It is my firm opinion that with fair play the excellence of our product and of the service which we give to the public will enable us to do far more than hold our own in the future. We ask for no favours, we only ask to be allowed an opportunity of competing for business on equal terms. I referred at some length last year to unfair competition, and I am glad to say that in certain quarters there has been an improvement in this respect. But I regret to say, there are a few municipalities which control their own electrical undertakings, and, fearing to leave the choice between gas and electricity to the tenants of new houses and flats, take the unfair precaution of excluding gas from the start. This is a tendency that we mean to fight both as traders and as large ratepayers. [Applause.] We are quite content to leave the choice between gas and electricity to the people who have to cook and wash and make their homes cheerful and warm, but we do not want them to be dictated to.

Important Developments.

One of the most important developments during the past year in this Company has been the erection of the new coke oven plant at Beckton. This has now started work, although it has not yet been formally opened, and promises to be a very useful adjunct to our manufacturing capacity.

The manufacturing stations of Pinner and Grays have been closed down, as we found ourselves in a position to manufacture gas elsewhere more cheaply. The men employed have been transferred to other stations.

At Brentford we have almost completed the reconstruction of the works, and during the coming year we expect to find ourselves in possession of a completely new and up-to-date works in the centre of an important and fast-growing district.

At Richmond the low-temperature plant has been closed down, as it proved to be a commercial failure, and we were losing money in working the plant. In passing, I should like to say—and I lay stress on this—that we are willing to adopt any process of carbonization, whether high or low temperature, provided it can be made to pay. The cessation of the supply of "Gloco" was regretted by a number of people who had become accustomed to its use, but we sincerely hope that they will try our new and cheaper fuel "Cleanglow" and find it equally suitable for their requirements.

New showrooms have been opened at George Lane, Mare Street, Harrow, Southall, and Billericay.

From what I have said you will see that every effort has been made to keep the Company thoroughly up to date in its many and varied activities.

The Recent Bill.

The Bill, which as you remember we promoted in Parliament last year, passed through all its stages and received the Royal Assent at the beginning of July. Apart from the right it gave us to acquire the undertakings of the Southend and Brentwood Gas Companies, our statutory enactments were altered with regard to the basis upon which our dividends are calculated, and, as explained to you at the last meeting, we are now working on what is known as the "basic principle." The Act also gave us additional borrowing powers and this matter will be referred to at the extraordinary general meeting which will follow at the conclusion of this meeting. Finally, the Act gave us power to acquire a financial interest in other allied industries, thus granting the Company some of the powers for which the Industry as a whole has been striving for many years. The Company will now be free to develop its activities with regard to residuals on businesslike lines, and will be able to join up with companies formed for the specific purpose of dealing with bye-products instead of having to carry on this side of its business in isolation as a competitor. This, I am sure you will all agree with me, will be to the benefit of the Company.

During the autumn, as I have already said, an International Illumination Congress was held in London. A special feature was made of floodlighting, and we joined with the electricity industry in this effort to illuminate London. I think that those of you who saw the floodlighting at St. James's Park and Whitehall will agree that it was a most attractive gas display. It really made a fairyland of the park and lake, and as a result we received many congratulations from the Press and general public.

Parliament and Industry.

As I have told you, the Gas Light and Coke Company has been fortunate in its latest Act of Parliament to get some relief from the trammels which have bound it for so many years, but I regret to say that no relief has yet been given to the Industry as a whole. A Committee, of which I have the honour to be a member, was appointed early last year by the Board of Trade to consider what alterations were required in gas legislation. Many meetings have been held, and certain progress has been made.

I can only hope that after the Committee has reported, Parliamentary time will be found to put its recommendations into effect, especially as they will be largely based on those made long ago by various Government Committees, most notably the National Fuel and Power Committee.

If I might be allowed to do so in this connection, I should like to point out that a very definite duty, in my opinion, devolves upon Parliament to pass legislation for the industries which it has taken under its wing. At one time the number of industries which were under this form of tutelage was very limited, but there is a growing tendency to increase their number—for example, the Port of London Authority, and the proposed London Traffic Control. The industries in this category are really working under "Minutes" or Parliament, if I may so put it. In the Board-room of the Gas Light and Coke Company we are allowed to take decisions, but they are all subject to the Acts or "Minutes" of Parliament governing the Company, and if Parliament takes the responsibility of acting as if they were a superior Board of Directors they should realize that time must be found to alter the statutory enactments which govern us. Many of the "Minutes" of Parliament affecting the Gas Industry go back to 1847 and 1871, and many of them are quite antiquated. I mention this because it has become a very serious matter for the Industry to have to continue year after year working under out-of-date provisions, which Parliament says it has no time to alter. In my opinion, it is high time that ways and means were found to change the present Parliamentary procedure. What would be said, for example, of a Board of Directors who gave as an excuse for not adopting the latest business methods that they could find no time to do so? This is exactly what is happening in Parliament.

The Financial Crisis.

The last time I addressed you I made some remarks about the financial position of this country, and I pointed out that no nation, company, or individual could go on living beyond its income. What I said proved to be only too true of this country. We have gone, and are still going, through one of the greatest crises in our history. It is a good thing that, even at this late hour, the country has wakened up, and that the question of the adverse balance of trade is now being seriously tackled. It is all to the good that the country is aware of the position, and that the Government is trying to put our house in order. But what the Government is trying to do for the country as a whole must be done also by the many individual industries that go to make up the business life of the country before we can hope to see ourselves as a country in a better position. The Gas Industry is a very old industry, and is one of the most important in the country, having 120 years' experience of business and trade at its back. We are, in spite of violent competition, a healthy and vigorous Industry, and it may be of interest to give what are, in my opinion, some of the reasons why we are in this happy position.

Benefits of Efficiency.

First, we have never paid excessive dividends, and whenever we have had a good year's trading the surplus profit that has accrued has been carefully set aside to enable us to carry through a programme of reconstructional work in the lean years which were bound to come.

Secondly, we have never hesitated to scrap out-of-date and obsolete plant, and to-dav I think it will be found that no one is better equipped with modern plant than we are.

Thirdly, we are fortunate as an industry in having, I admit through no merit of our own, no temptation to enlarge our works to supply markets, beyond those of which we are assured, inasmuch as it is useless to put up plant to make gas in excess of the needs of the public. In other words, we can estimate for an approximately known demand. This is not the case, of course, with most other industries, and unfortunately one of the greatest causes of our industrial troubles at the present moment is the lack in the past of regard by manufacturers as to the possibility of their markets being able to absorb what is produced.

The "Buy British" Campaign.

Great Britain is now in the serious position of having in many industries a great excess of manufacturing plant, involving a serious waste of capital and thereby increasing the cost of the manufactured articles. The only chance we have as a nation of regaining our position is to produce the goods which are wanted at the lowest possible prices. This can only be done by efficient methods of manufacture and by seeing that capital is not wasted in building plants which are too big for the markets which still exist. In other words, the dead wood of unproductive works must be cut away.

Much emphasis has been given—and rightly given—in recent months to the urgent need to "Buy British," and the Gas Industry, which employs British capital, labour, and materials, willingly responded to this appeal. But the Government wisely pointed out in its campaign that "Sell British" is the necessary complement to "Buy British." More overseas trade and less trade barriers are the need of this country in this difficult hour.

Countries, while naturally making every endeavour to develop their own resources, should remember that they cannot live in isolation, and that the greatest necessity of the world to-day is first to get rid of the nightmare of war debts and reparations and then to restart mutual trading on a rational and progressive basis. It is in this way alone that prosperity can return, and I sincerely hope that the adoption of tariffs by this country will lead ultimately to a reconsideration of the whole question of world production and world trading, in which case the present terrible world crisis will not have been all in vain.

Economy and Wise Spending.

This leads me to say a word on economy, in regard to which there is a great deal of erroneous thinking. Many people have interpreted economy as meaning that it is desirable for them to button up their pockets and spend no money. The reverse, however, is nearer to the truth. Liberal and wise spending was never more necessary than to-day for anyone who has anything to spend. To retire into one's shell and do nothing is the greatest disservice anyone can do to the country at the present time. What is needed is economy in public and Government expenditure, not so much in expenditure by individuals. [Hear, hear.] If trade and commerce are to be assisted to the full, it will only be through wise expenditure by industries and individuals and not by the unrestricted and lavish expenditure indulged in by State Departments and municipal bodies. Judging by the growth of public expenditure, it would seem that we as a country are spending too much on being governed.

Staff Changes.

Speaking now of more personal matters connected with the Company, Sir Francis Goodenough, who held the office of Controller of Gas Sales for 28 years, and spent altogether 43 years in the Company's service, has retired. I am glad to say, however, that, although he has left the Company, the Industry, which of course includes this Company, will still be able to profit by his knowledge and experience in salesmanship. He still continues to act as Chairman of the executive committee of the British Commercial Gas Association, which, as most of you know, is the central body in the Industry dealing with sales and propaganda. Sir Francis carries into his retirement our cordial good wishes that he may long have good health to enjoy his pension and to carry on his work for the Industry.

Mr. Stephen Lacey, the Distributing Engineer, who has acted as deputy to Sir Francis since 1923, has been appointed by the Directors to be Controller of the Gas Sales Department. In Mr. Lacey we have a most excellent officer, who, we feel sure, is fully capable of looking after and furthering the Company's interests in this most important branch of its work.

We have also appointed Mr. A. P. Ryan, of the Empire Marketing Board, our Publicity Manager, and we wish him all success in his work.

I regret to record that we have suddenly and unexpectedly lost two most loyal and valuable officers of the Company—namely, Mr. Holt and Mr. Larkin—who were in charge of our meter and stove works, and our sympathy goes out to their relatives in their great loss.

Loyal Team Work.

I am glad to say that our relations with those who work for us have been of the most cordial nature and the whole of the Company from the top to the bottom has worked splendidly during the year. Co-partnership goes on from strength to strength. Financially, co-partners hold over £900,000 of the Company's stock, but I feel that what is even more important is the fine spirit of loyalty to the Company which permeates all ranks. In evidence of this I would like to refer to an incident that occurred on June 27, on the occasion of our annual gathering at our Acton Sports Ground, when two chosen delegates on behalf of the 11,128 members of the 44 sports clubs which constitute the Company's Sports Association, presented a beautiful Sheffield plate tray to the Directors as a token of their gratitude for the encouragement given to the Sports Association during the ten years of its existence. I think no more graceful act can be imagined, and, speaking on behalf of the Directors, who were deeply touched by this gift, I would like again to thank the donors one and all. It was characteristic of the thought that inspired the gift that the tray shosen was one that had been made in 1812, the year the Company came into existence.

I have pleasure in moving:

> That this meeting do agree with and confirm the report of the Directors and the Auditors' report and statement of the accounts of the Company for the year ended Dec. 31, 1931.

Before putting the Resolution to the meeting I shall be happy to hear any remarks which proprietors may wish to make and to endeavour to answer any questions they may ask.

Mr. Henry Woodall, M.Inst.C.E. (the Deputy-Governor), formally seconded the resolution.

Mr. J. B. Clarke said that there was one question he would like to raise, and that was in connection with the unfair discrimination which existed between gas and electricity in regard to the methods of charging. Why should one industry be allowed to charge two rates for the same product, while the other had to supply its product through one meter for all purposes? Why should this big disparity be allowed in the charges made by the electrical industry of (say) 4d. or 5d. per unit for lighting and 1d. or 2d. for heating? The Directors should make every effort to have this disparity removed.

The Governor, in reply, said that they had been asking themselves this question for a long time. It was a question to which the Board were giving a lot of attention, and they were hopeful that steps would soon be taken to bring this matter home to the proper quarter, and reformation be secured.

The resolution was then put to the meeting and carried unanimously.

The Dividends.

The Governor: I will now ask the Secretary to read the minute of the Court of Directors recommending the dividends for the last half-year.

The SECRETARY thereupon read the following from the Directors' minutes of Jan. 29, 1932:

Resolved, that it be recommended to the Ordinary General Meeting of Proprietors to be held on the 12th proximo—

(1) That the sum of £20,000 be set aside out of the divisible profits of the Company for the half-year ending on the 31st day of December last towards the Redemption Fund, in accordance with the provisions of the Company's Acts of 1903 and 1926; and

(2) That dividends as follow for such half-year be declared, viz.:

	£	s.	d.	
On the 4 p.ct. consolidated preference stock at the rate of	4	0	0	p.ct. per annum
On the 3½ p.ct. maximum stock at the rate of	3	10	0	,, ,, ,,
On the ordinary stock at the rate of	5	12	0	,, ,, ,,

All subject to deduction of income-tax.

These recommendations were adopted, on the proposition of the GOVERNOR, seconded by the DEPUTY-GOVERNOR.

RE-ELECTION OF DIRECTORS AND AUDITORS.

The GOVERNOR: Two Directors (the Viscount Mersey, C.M.G., C.B.E., D.L., and Sir Harold Brewer Hartley, C.B.E., M.C., F.R.S.) retire by rotation, and I have great pleasure in moving that the Viscount Mersey be re-elected.

The DEPUTY-GOVERNOR seconded this, and it was agreed to.

The GOVERNOR: I now have pleasure in moving that Sir Harold Hartley be re-elected.

The DEPUTY-GOVERNOR seconded the motion, which was passed, and acknowledged by the two gentlemen.

Thereafter the Auditors (Messrs. J. A. Stoneham and P. H. Ashworth) were unanimously re-elected, this concluding the business of the Ordinary General Meeting.

EXTRAORDINARY MEETING.

An Extraordinary Meeting of the proprietors was then held to consider resolutions sanctioning the raising of additional money by borrowing on mortgage of the Company's undertaking or by the creation and issue of debenture stock.

The GOVERNOR called upon the Secretary to read the notice convening this meeting.

The SECRETARY read the notice.

The GOVERNOR, having declared the meeting to be an extraordinary meeting for the purpose mentioned in that notice, went on to say: I referred in my speech to the fact that our Act gave us additional borrowing powers. The amount, as you will see from the accounts before you, is a fairly substantial one, and to this there will be added a further small sum in connection with the amalgamation of the Southend and Brentwood Companies. The resolution to which you will be asked to agree, however, deals only with the amount of the unissued capital as on Dec. 31.

The last occasion on which we obtained borrowing powers was on the passing of the 1926 Act and an extraordinary general meeting was then held to give the Directors authority to raise the loan capital specified in that Act, and this present meeting has been called for a similar purpose in connection with the 1931 Act. The Company, as I have told you, is making very rapid progress and money will yet have to be found for the purpose of extending our mains and for the provisions of new appliances of every description, but although the resolution which will now be put forward will give the Directors full authority to make an issue of the loan capital referred to, they will not, of course, exercise this power unless the situation arises which demands it. I may say that there is no intention of raising further money at the moment, nor, indeed, in the near future.

The GOVERNOR then called upon the Secretary to read the resolutions, which were as follows:

That the raising by borrowing on Mortgage of the Undertaking of the Company or by the creation and issue of Debenture Stock or partly by one of those modes and partly by the other of them of money to an extent not exceeding Four million two hundred and seventeen thousand five hundred and ninety-four pounds (being the whole amount authorized to be so raised as on the 31st day of December, 1931) be and the same is hereby sanctioned.

That the Directors be and they are hereby empowered (subject to and in accordance with the provisions of the Gas Light and Coke Company's Act, 1931, and the Acts incorporated therewith and without prejudice to the rights and powers of the Directors under section 56 of the said Act of 1931) to borrow such money and to issue such Debenture Stock at such time or times in such amounts and manner upon and subject to such terms and conditions and with such rights and privileges as the Directors may from time to time determine.

The GOVERNOR then formally moved the resolutions, which were seconded by the DEPUTY-GOVERNOR and unanimously agreed to.

WHARNCLIFFE MEETING.

A Wharncliffe Meeting was then held to consider a Bill to be introduced by the Company into Parliament intituled "An Act to extend the limits of supply of the Gas Light and Coke Company; to empower that Company to execute certain works and to acquire certain lands; to confer various powers upon that Company; and for other purposes."

The GOVERNOR: The business of the first Extraordinary Meeting being now concluded, I call upon the Secretary to read the notice convening the second Extraordinary Meeting.

The SECRETARY having read the notice,

The GOVERNOR declared the meeting to be a second Extraordinary Meeting for the purpose mentioned in the notice relating to such meeting. Before addressing the proprietors on the subject of the Bill, he asked the Secretary to read the heads.

The SECRETARY then read the heads of the Company's Bill.

The GOVERNOR, in moving the approval of the Bill, said: As you have just heard, the main object of the Bill is to add the area known as Canvey Island to the Company. A piece of land to the extent of some 83 acres has been purchased on the south side of the island, with a frontage having the advantage of deep water. The Directors, in looking ahead, considered it advisable to make a purchase of this piece of land, so that if at any time it was found necessary to extend our manufacturing capacity beyond the precincts of the existing works of the Company a site would be available for this purpose. It is necessary, as you know, for a gas company to obtain the authority of Parliament before any land it possesses can be used as a gas-works, and the Bill is designed to ensure this and at the same time to give the right to supply gas over the whole of the island.

The Bill was unanimously approved without discussion.

VOTE OF THANKS.

Mr. C. CHAMBERS proposed a hearty vote of thanks to the Governors, Directors, and staff of the Company, remarking that this was the only occasion in the year when the shareholders on that side of the table had the opportunity of expressing their praise, or otherwise, of those who were conducting the affairs of the Company. Every stockholder was concerned this year, perhaps more than usually, as to whether or not he was going to get a dividend—especially those depending entirely or mainly on dividends from their investments. Some of them knew only too well what had happened in many industries, which made them very glad, he was sure, that they had their money invested in gas companies. And he was sure they were specially glad to be shareholders in this Company, to the vastness of which the Governor had referred in the course of his able address. He had intended drawing attention to this matter himself, because he sometimes wondered whether it was generally realized to what extent the Company had grown. The General Manager, the Engineer, the Distribution Superintendent, and others all had to help in keeping the plant adequate to deal with their increasing supply of gas. He would like to add appreciation of the fact that this Company did not live only for itself; it was willing at all times to help the Gas Industry as a whole. The Gas Light and Coke Company had always been in the van of progress.

Mr. E. MANN seconded the vote.

Mr. W. H. FAITHFULL, supporting the vote, mentioned that they were in a very good position to-day in comparison with other undertakings, in the fact that there was an excellent relationship existing between the Board and all ranks of employees. It had been his privilege and pleasure on two previous occasions at different functions to be able to congratulate the Governor and Directors upon the sailing of the ship of the Gas Light and Coke Company in pleasant waters, when other industries were in the throes of disputes and unrest. To-day there existed the same cordial relationship between all connected with the Company, and this was something for which they should be extremely thankful. It had in no small measure brought success to the huge undertaking about which they had heard that day. The more he saw of the co-partnership movement, the more he was convinced that it was to industry what the safety valve was to the engine; and if there was anyone present who was interested in any industry which had not adopted co-partnership, he hoped he would go away from that meeting and do all he could to bring about its introduction.

The vote was carried unanimously.

The GOVERNOR: On behalf of my colleagues on the Board and the staff, I want to thank you for your encouragement and support, which are of great value, and help us to go forward to another year hoping that the future will be bright, even though the present be troubled and stormy.

South Metropolitan Gas Company

ORDINARY GENERAL MEETING

The Ordinary General Meeting of the Proprietors of the Company was held at Southern House, E.C. 4, on Wednesday, Feb. 10—Dr. CHARLES CARPENTER, M.Inst.C.E., in the chair.

The SECRETARY (Mr. Frank Day) read the advertisement convening the meeting, and the minutes of the last Ordinary General Meeting and Extraordinary General Meeting. Thereafter the seal of the Company was affixed to the Register of Proprietors.

The PRESIDENT:

Ladies and Gentlemen,—If this undertaking were other than a statutory one supplying, as it has for over one hundred years, a commodity in daily use in an area definitely prescribed by Act of Parliament, or if you were to compare it with other similar ones whose fields for expansion are seemingly limitless, you might feel dissatisfied with a growth so slow as to be but ¾ p.ct. in its production, or a nearly similar percentage in the number of its consumers. But you must remember, when you consider our position, that one may increase in strength as well as in size, and although the evidence thereof may not be so striking in the former case, I can assure you that it exists. Putting aside certain municipal instances where the authority was unable to meet the competition of gas except by excluding its use in their estates, practically every house has a gas supply laid on to it as certainly as it has one for water. Our task in such circumstances naturally becomes mainly one of improving our present services rather than that of adding new ones. I may remind you that our activities in this direction are already of a very extensive character. We are responsible for the design, construction, and repair of the great bulk of the appliances used by the gas consumer. We select these as the result of careful testing in our physical laboratory, and in order to ensure complete satisfaction by the users, all appliances are either assembled or tuned-up by us to their exact requirements so that no further adjustments are needed upon the users' premises. In regard to one-half of our gas production, this service is a complete one. It extends to every fitting and appliance, and explains the high figure of costs which appears in the accounts under the general heading of "Distribution." These arrangements apply specially to the domestic customer. In the case of industrial gas the position is somewhat different. The manufacturer comes to us with his requirements, and our practice mostly is to design the apparatus necessary to fulfil them. In other cases he may be already using inefficient plant which we test and overhaul so as to make it more efficient and therefore more economical. For power purposes imported oil, and electric energy heavily discounted in price, have retarded our progress, but the gas-driven engine provides a convenient source of power, helpful to the would-be user of energy in bargaining for an alternative supply at a low cost, and thereby, of course, indirectly aiding us in our competition.

A WELCOME CHANGE OF ATTITUDE.

I spoke just now of the restrictions placed upon the tenants of municipal houses in regard to the taking by them of a supply of gas. I am glad to say that the attitude of these authorities shows a welcome change from that upon which I dealt so fully a year ago. Unfairness and injustice react in the long run upon those by whom they are practised, and there undoubtedly exists a widespread feeling of resentment at the tactics adopted to drive out of business an Industry which makes so great a contribution to the health and comfort of the public.

What I have been saying with regard to the domestic use of gas applies also to its public use. The road mileage in our area of supply grows, and can grow, but slowly. The authorities have, however, realized the necessity of increasing the standard of lighting, and the ability of the Gas Company to provide it. Anyone using the main thoroughfares of South London cannot fail to have been struck with the beauty and completeness of the lighting of the principal roads by high-pressure gas. Whether by high or low pressure, however, street illumination by means of the incandescent gas mantle has proved itself most efficient for all purposes, and to-day it is only necessary for the road authorities to state their requirements for the Gas Company to carry them out.

LOW FIGURE FOR UNACCOUNTED-FOR GAS.

The report goes on to inform you that the process yields of gas and products have been satisfactory, and that the gas not accounted for is again below 1 p.ct. of that distributed. This low figure is the more remarkable when we remember that coal gas, by reason of its lighter specific gravity, is about three times as elusive, if I may apply such an expression, as the air we breathe; that pressure requirements tend to increase rather than decrease; and that the sub-soil of our roads and streets is being more and more occupied for purposes other than sewers and gas and water mains. The unfair treatment frequently meted out to towns gas is typically exemplified, I think, in the case of the Holborn explosion. This accident, which happened in an ineffectively ventilated Post Office tunnel, put out of action the supply of gas which forms one of the stand-by sources of light required by the London County Council to be installed in all places of public entertainment owing to the possible failure of the electricity supply. This exceptional case is being used as a reason for requiring the replacement of auxiliary gas supplies which have for the past thirty or forty years provided without fail an alternative supply. Only two or three weeks ago the entire service of electric current failed in a well-known provincial town owing to a failure in connection with the much boomed grid. But it is reported that the theatre was able to continue its performance of the Christmas pantomime by gas-light without the audience being much the wiser for the change. Whatever may be the merits or demerits of gas it easily takes the palm from its competitor for reliability, and the efforts to displace its use in these cases is grossly unfair. I might add that in practically all those instances in South London where damage to our gas mains threatens to be serious, this is consequent upon fusions of the electric cables. Before leaving this matter you will be interested to learn that the distribution losses of electric energy are many times those experienced by this Company in regard to gas.

BYE-PRODUCTS.

The next paragraph of the report deals with our bye-products. It is an unfortunate happening that while we have brought up the quality of our sulphate of ammonia to a standard which is unexcelled by any other make, the substantial return once received from its sale has during the year dwindled to some £10,000, and at present its manufacture is being carried on at a heavy loss. The case is an excellent one of what might be described as irrationalized rationalization. In the carbonization of coal, whether in gas retorts or coke ovens, ammonia is an unavoidable product. But throughout the length and breadth of the land this fertilizer is being thrown away and expensive plants for its refinement abandoned because the synthetic plants were designed for a greater production than the country needs.

A pre-war distinction between the respective relationships of the German and British manufacturers to their customers was that the former were never backward in producing what the consumer said he wanted, whereas the British endeavour was always to get the consumer to take what was made. A few years ago we filled our barrels with tar, loaded them for rail or road, and thought no more about them. To-day we have not only to deliver our tar, rectified to definite standards, on the road where it is to be used, but to put it there at the most suitable temperature for its efficient use. Here we are in competition with imported bitumen. Why foreign bitumen should be imported into this country when we make a product equally suitable for road surface purposes from our own coal raised by our own not too fully employed labour, is one of the puzzles I am unable to solve. It is reported of Signor Mussolini that he asked, "Why import foreign bananas, when you have your own home-produced grapes and figs?" We may well ask, "Why import foreign bitumen if all that is needed in the way of road binding and surfacing material can be provided by specially prepared British coal tar?" Though every endeavour is made to discredit it by interested people, it can to-day hold its own as a result of the scientific treatment it now receives, and which is constantly being improved as the result of continued research. In connection with this I should add that the leading tar distillers are working in this matter with guidance from the road authorities.

The case of burning-oil is another extraordinary one. In order to make our mines pay their way we are subsidizing them by charging the British coal user a higher price than is paid by the foreign user for the same article. But we have to meet the serious competition of imported burning-oil, apparatus for using which is being installed by, for example, the large banks because its use is stated to save labour and to be more convenient. Here again I can imagine a British Signor Mussolini inquiring: "Why import foreign oil when British coke made from British coal, raised by British labour, would provide all the heat your offices need for their central heating?" We ourselves might add, "And what about gas?"

LOW-TEMPERATURE FUEL.

It has been found desirable to extend our field for domestic heating by the provision of what promises to be a popular variety of smokeless fuel. While gas is eminently suitable to heat rooms and dwellings by radiation from the gas fire, or convection from central heating installations, we have to face the fact that the open fire is still a desideratum with a certain class of consumer. To supply his wants, therefore, we must provide him with some type of solid fuel. It is on this account that we undertook the manufacture of low-temperature fuel, and we are to-day producing a material which can in all respects satisfy the requirements of a coal-burning public.

We started up our plant for the production of "Metro-Coalite" about this time last year. We had reason, however, to be somewhat dissatisfied with the quality of the product we were producing, so in the end we shut down for the summer months. We started again at the beginning of last autumn, and since then have been producing an article of good quality, the demand for which is an improving one. But we have not yet built up our market, and the plant is only working at a fifth of its capacity. Obviously we cannot be sure of our works costs under these conditions, and I must therefore defer a fuller account of the progress of this branch of our business until some future occasion. The material is certainly being sold at a price that is higher than that charged for the best household coal, but the extra cost is repaid by the increased efficiency to

be obtained. In other words, " Metro-Coalite," when compared with the best quality of other solid fuel, need not be more a material of luxury than soft coal. As a matter of fact, " Metro-Coalite " is sold in paper bags, and it gets a market in districts which cannot be regarded as the rich ones.

High-Temperature Coke.

For those, however, who require the cheapest and most economical solid fuel for combustion in the open grate, coke as to-day prepared and burnt in a " Metro " coke grate is the best solution of the problem. The consumer, of course, has to meet the initial expense of installing a suitable grate, if he has not one already, and of connecting the gas supply thereto, but this cost is quickly recovered by the economy effected in burning coke.

The Gas Fire.

It is unnecessary for me to refer to the method of domestic heating by gas fires. I believe that the fire we supply at present is the ideal one so far marketed, but I do not conceive its design will remain as it is to-day. I have referred on a previous occasion to the work we carried out some time ago at the Treloar Home for Cripples, and on that occasion, I believe, used the expression " comfortable heat." We have not stood still in this matter, and have carried out a good deal of work in studying the manner in which heat is transferred through the skin as well as through other materials. For heating an ordinary room the gas fire is the most efficient and effective machine, but I am not quite sure whether its application could not be improved upon. There is something dear to the British subject in the open coal fire, and although we believe that a good deal of this preference may be explained by the psychologist, yet there is something about the nature of flame which in addition to being pleasant works more beneficially in penetrating below the surface of the human skin and thereby warming the blood stream.

Under a patent that we took out in 1927 we have been experimenting in the construction of gas fires which will emit short infra-red rays when a room is to be heated, but which can be adjusted when people enter the room to give to these red rays a luminous effect. To what extent the fire is more health-giving than those we are at present supplying is a highly contentious matter, upon which it is exceedingly difficult to obtain satisfying scientific evidence.

Reference should also be made to the system of heating water by domestic boilers which is gaining such popularity in the large towns. Our experience indicates that coke can be admirably adapted for this purpose, and we have manufactured experimentally an article that seems specially suitable for this requirement.

I think, therefore, it may be said that the gas companies of to-day set out to supply more than one means of domestic heating. Each method has its particular charm, and from which individual fancy can be satisfied.

The profit for the year left but a small margin after providing for a total dividend for the year of 6 p.ct., and in the circumstances your Directors did not consider themselves justified in adding to this from the Reserve Fund. The next paragraph in the report I will deal with at the Extraordinary Meeting.

As regards paragraph No. 7, until we received advice to the contrary we were under the impression that we should re-issue, and at a lower rate of interest, the debenture stocks raised under our Acts of 1916, 1918, and 1921. As a result we decided to make no offer of an exchange of stock, but in substitution therefor to fulfil our obligations by a cash repayment. The discount on the issue had therefore to become a charge upon the year's working.

If the report makes no mention of the Co-Partnership, it is simply because the association of employer and employed under the principle known by that name has become an integral part of our year in and year out working, fulfilling a duty unachievable by any other means. The great care we exercise in the planning of the conditions under which our employees carry on their work has been an outgrowth from it. I have always had doubt as to how far industry is responsible for abnormal ill-health, and the conclusions stated by our medical officers in their report for last year confirm this. They write, *inter alia*, as follows:

> The standard of health among the Company's workpeople as a whole is good.
>
> The maladies from which employees chiefly suffer are similar in character and extent to those which apply to insured persons generally.
>
> Respiratory diseases are the predominant cause of illness at all ages.
>
> There is a high rate of sickness among the younger workers, and this corresponds with the general experience of the country.
>
> It is a matter for consideration whether employees below the age of 25 should be examined periodically.
>
> Shift-workers have no more sickness than day-workers.
>
> In general a healthy man to-day does not suffer primarily by reason of the work he does; but a certain type of employment will reveal more readily than another the particular maladies to which the persons engaged in it are normally prone. With the exception—in very rare cases—of certain diseases scheduled under the Workmen's Compensation Act, it is clear from our statistical evidence that, so far as the Company's workpeople are concerned, no specific class of disease can be said directly to arise from any particular kind of occupation.

I have now to move:

> That the Report and Accounts now presented be received and adopted, and the Report entered on the Minutes.

The Vice-President (Mr. Frank H. Jones) formally seconded the motion.

The President: The report is now open to discussion, and I shall be pleased to hear any remarks which shareholders may desire to make.

Col. Hilder said that he thought they must congratulate the Board upon giving this very voluminous report. Turning to the balance-sheet, he noticed that on one side there appeared an item, " Cash at Bankers and in Hand " of £46,000 odd, while on the other side there was shown a temporary loan from bankers of £750,000. The President had mentioned the competition with which they were faced. This was a matter in which the Board should move energetically. They must be strong, and demand fair treatment. Everything possible must be done to protect their interest.

Mr. W. Phillips asked why there was a decrease of £16,000 in the amount paid into the co-partnership fund.

The President, in reply, stated that the smaller amount paid into the co-partnership fund was on account of the smaller amount of the dividend for the year paid to the shareholders. There was a definite relationship between the amount of money appropriated as extra dividend for the shareholders and the bonus paid to co-partners over and above their wages. The standard in the case of the shareholders was 5 p.ct., and the standard in the case of employees was the ordinary rate of wages. From the surplus profits an equal amount was transferred, in one case by way of increased dividend to the shareholders, and in the other case by way of bonus to the employees. So that the amount to the co-partners had fallen as the amount paid to the shareholders had also been reduced. In regard to the remarks of Col. Hilder, he could assure the meeting that day in and day out they were fighting those persons with whom they were in competition. That they were successful was shown from the accounts. If these were satisfactory to the proprietors, surely it was indicative that the Board were applying themselves properly to the problems they had to face. The report referred to the fact that £734,000 had been paid off, which was very nearly the figure of the bankers' loan, and it was therefore touch and go whether they owed a little or had a surplus. But for the fact that this £734,000 loan had come to an end, they would not have been owing £750,000 to the bank. Regarding the additional figures asked for, this would have the consideration of the Board.

The motion for the adoption of the report and accounts was then put to the meeting and carried.

The Dividends.

The President then moved:

> That the following dividends be now declared—viz., 6 p.ct. per annum for the half-year ended Dec. 31 last on the preference stock, and 6 p.ct. for the year ended Dec. 31 last on the ordinary stock, less the interim dividend paid in respect of the first half of the year; and that warrants be transmitted to the registered addresses of the Proprietors by post for the amount of such dividends.

The Vice-President seconded this, and it was agreed to.

Debenture Stock Issue.

The President: I have now to move another resolution—in two sections:

> (1) That the Company do borrow by the creation and issue of debentures or debenture stock, or partly by one and partly by the other of those modes, the amount of £744,252.
>
> (2) That the Directors be and they are hereby authorized to issue such debentures or debenture stock or any part or parts thereof respectively as they think fit, at such time or times, at such rate or rates of interest, at such price or prices and otherwise on such terms and conditions as they may determine at the time or times of the issue thereof.

The President explained that these resolutions gave the Board authority to issue at any particular time stock for which the consent of the shareholders had already been given.

The Vice-President seconded this resolution, which was unanimously agreed to.

Re-Elections.

On the proposition of the President, seconded by Mr. B. R. Green, Mr. Arthur Matthews Paddon and Mr. Frederick McLeod, J.P., were re-elected Directors of the Company.

Mr. Paddon: I beg to thank you very sincerely for the compliment you have paid me in re-electing me a Director.

Mr. McLeod: Thank you very much. I shall be delighted to continue to serve you.

On the proposition of Col. Woolley, Mr. Charles Pelham Crookenden, F.C.A., was re-elected an Auditor of the Company, for which the latter returned thanks, this concluding the business of the Ordinary General Meeting.

Extraordinary General Meeting.

The President: Now we come to the Extraordinary General Meeting, and I will ask the Secretary to read the notice convening that meeting.

The Secretary read the notice.

The President said that from time to time it was necessary to broaden the basis of their business, and to do so they had to obtain an extension of their existing powers. For this

purpose the Directors were promoting a Bill " to increase the capital powers of the Company, and for other purposes," and he would run through the clauses of the Bill, explaining the meaning of its various provisions.

The Bill provided for additional capital to the extent of one million pounds in ordinary or preference stock. The stock so created was to be part of the general capital of the Company. Preference capital was to bear such rate of interest as the Directors might determine. The mode of issue was set out in the Bill. Following this there was an important clause which gave the Company power to invest in the securities of other companies under conditions enumerated. It was, however, provided that the aggregate amount applied by the Company for the purposes of this section, and remaining so applied at any time, should not exceed one-tenth part of the nominal amount of the issued capital of the Company for the time being. Thus, while recognizing the desirability of the Company associating themselves with other undertakings, the Bill ensured that such interest should remain a minor part of the Company's activities.

The next clause also was an important one, the first paragraph being as follows: " The Company and any company, body, or person authorized to supply gas under statutory powers may, with the approval of the Board of Trade, enter into and carry into effect agreements for the amalgamation, purchase, leasing, or joint working or management of their respective undertakings, including agreements for or in connection with the joint use of buildings, works, or plant, and the provision or adaptation of buildings, works, or plant for such joint use, and for the setting up and joint use or carrying on of establishments for research and generally for any purpose which will in the opinion of the parties to any such agreement conduce to the more economical or efficient manufacture, distribution, or sale of gas or manufacture, working up, conversion, sale, or use of residual products."

Prepayment Meter Charges.

After a clause giving the Company power to break up streets beyond the limits of supply, there was another important one dealing with prepayment meter charges. At present the Company were empowered to make an additional charge of 1¾d. per therm for all gas supplied through the agency of slot meters. This money was applied to the provision of the meter itself, the appliances or fittings, and the cost of collection. What the Company found was that the number of appliances used in connection with the prepayment system had greatly increased since it was first adopted. The Company's original idea was to supply a limited installation, consisting of a meter, a small cooker, and three lighting points. Now the prepayment consumers in very many cases were not content with a small cooking stove. They wanted larger and more costly stoves as well as fires—often both fires and cookers. On the one hand, the Company have slot meter consumers whose gas consumption is very small, and on the other hand there are many slot meter consumers using comparatively large quantities of gas. The latter consumers were consequently paying a rental in excess of what should be necessary to meet the fittings charges, because they continued to pay after the hire of the installations had been met; when this rental had been recovered, they should of course be relieved from further payment in this respect, and obtain their gas at the ordinary price. To enable this to be done, however, it was necessary to increase the maximum addition which the slot meter consumers paid, and the increased charge would be made on gas consumed up to a certain quantity. Beyond this consumption, they would pay only for gas, and not for gas *plus* rental charges. Therefore, the Company were asking for authority to raise the charge from 1¾d. to a maximum of 3d. per therm. By thus doing they would not make any profit—they did not do so now—by the installation of these appliances. Their profit was made on the gas which was sold, and not on the rental obtained from the meter, fittings, and appliances.

After briefly referring to the remaining clauses, the President put the resolution:

> That the Bill now submitted to this meeting entitled " A Bill to increase the capital powers of the South Metropolitan Gas Company and for other purposes " be and the same is hereby approved subject to such additions, alterations, and variations as Parliament may think fit to make therein.

The Vice-President seconded the resolution, and, no questions being asked, it was put to the meeting and carried unanimously.

Votes of Thanks.

Mr. T. A. Braddock then proposed a vote of thanks to the President and Directors of the Company, saying with what keen anticipation he looked forward to the President's address on these occasions. They had every reason to congratulate themselves on being shareholders in the South Metropolitan Gas Company. The accounts were satisfactory, covering as they did a very difficult period.

Col. Hilder seconded the vote of thanks, remarking that the shareholders might well be proud of their Board of Directors.

The resolution was carried unanimously.

The President, in acknowledging the vote, said that it was their reward to come there once a year and know that they left the meeting having the continued confidence of the whole of the assembled shareholders. Times were very difficult, but he could say that there was no relaxation on the part of any member of the Board or staff in their endeavours to meet the varying conditions they had to face. Competition was a good tonic for all, and they had their fill. He thought that the best testimony that could be given to the co-partners—and he could not give it to the Board, because it was not the Board's job—was to point to the changed attitude of the public authorities towards gas supply in South London in the course of the last twelve months. The antagonistic attitude about which he had spoken in no unmeasured terms last year he could not say had disappeared, but it had neither the force nor the power which it had last year, and a much more reasonable frame of mind existed to-day in those who were responsible for what is called the government of South London. He would ask the shareholders to support him in giving their best thanks of the meeting to the staff and employees of all ranks for the admirable way in which they had carried on their work.

Col. Woolley supported this proposition, remarking that twenty years ago he had commenced his career at the Company's Offices in the Old Kent Road when the co-partnership scheme was much smaller than it was to-day.

Mr. A. Stokes (Joint Manager) acknowledged the vote, which, he said, would be very much appreciated by all co-partners.

Commercial Gas Company

ORDINARY GENERAL MEETING

The Annual Ordinary Meeting of the Company was held on Thursday, Feb. 11, at Southern House, Cannon Street, E.C.—Dr. Charles Carpenter C.B.E., M.Inst.C.E. (the Chairman), presiding.

The General Manager and Secretary (Mr. F. J. Bradfield) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

The Chairman: Gentlemen,—You may remember that when I addressed you a year ago, I had to regret a substantial reduction in gas sales, although financially the Company had had a very successful year. The Capital Account had been reduced by some £14,000, and there was a surplus on the year's working over and above the amount required for Dividend and Interest of £13,000.

The figures I have to give you in respect of the past year are, however, in some respects not so good. It is true the sales of gas have been maintained notwithstanding the extremely mild weather in the last half of the year, but the amount receivable therefrom (including the Rentals of Meters and Stoves) is down by £3274, and the Expenditure side of the account (owing partly to an increase in the cost of coal, but mainly to the additional and improved service to the consumers) is higher by nearly £20,000.

The actual cost of coal bought—into works—was about 8½d. per ton more than in the previous year, which on the received quantity amounts to £9391. The lower priced stocks in hand at the beginning of the year and an improved yield of gas per ton enabled this to be reduced to some £4733. The present contracts should show a saving under this head in the current year's costs.

Increased Storage.

As regards the upkeep of the works, a good deal of useful work has been done. The reconstruction of No. 1 Holder at Stepney is now well advanced, and will be completed during the present half-year. In the past six years the Company has built one large new holder and rebuilt almost entirely two of the largest of our old ones, and our position as regards gas storage will in consequence be much better than at any period in our history. This work at Stepney will complete our programme of large-scale gasholder repairs, and it is hoped that it will then be possible to reduce still further our expenditure on works repairs and maintenance. During the year a new condensing plant has been erected and put to work at Poplar, where the old apparatus was inadequate to our needs. On the district the reconstruction of the Canning Town Bridge in connection with the Royal Victoria Docks Approaches Improvement Scheme has involved a large amount of alteration to the Company's mains, but the cost of this (except in so far as we have taken the opportunity to improve our system) is being borne by the public authorities promoting the scheme.

Expenditure on the District.

With regard to District Expenditure, the increase is mainly due to the replacement of old stoves and fires by modern and more efficient ones, no fewer than 3831 old stoves and fires having been " scrapped " during the year and written off our books. The sales of these appliances, which form a very important part of our apparatus to-day, continue to increase, and although the number on hire has fallen by 229, no fewer than 1997 were sold.

There appears to be some reason for desiring to purchase a stove outright rather than to hire one. It is probably because the hire list is a limited one, whereas the purchase range is unlimited. This may account for the falling off in one case coinciding with an increase in the number sold.

Systematic Inspection of Appliances.

You will not need me to inform you that if a stove or fire has been allowed to get into disrepair it is not only a bad advertisement for gas, but that it is also a loss of revenue. The systematic inspection which we are now making is bringing a number of such cases to light, and I am satisfied that if wintry conditions prevail our customers will greatly appreciate the work we have done. The additional expenditure incurred will be fully justified, and the appreciation of our more critical customers assured. Repairs and renewals of prepayment meters and fittings were also responsible for heavier expenditure. I referred last year to the inspection of lighting fittings. This was since speeded up and completed in July last. It is being followed up by a system of maintenance, and I am pleased to say that so far this has been a success.

Gas Lighting to the Fore.

Some persons seem to think that gas lighting is a thing of the past. I am not quite sure how far I gave you the figures last year, but I may tell you now that during the two years this scheme has been in vogue we have sold the almost incredible number of 100,000 lighting burners. We may assume that if people bought them they did not do so for decorative purposes but for the purpose of getting light. At the same time, we have exchanged 48,000 pendants and brackets, so that I think these figures, contrary to the feeling in some quarters that gas lighting is a thing of the past, should convince you not only that it is not a thing of the past, but is to-day still very much alive. This would not be true, of course, to the same extent all over London, but the area this Company supplies with gas is not exactly the same as Piccadilly or Park Lane, and what I say applies to our district and not necessarily to places where more luxurious lights—though possibly to some extent less efficient—are preferred. Indeed the working classes, if they are left alone—we have tested that—will prefer gas lighting to electricity. It warms their homes besides giving them a light which they prefer to electric energy.

These activities have meant additional staff and additional cost, but we believe that the money is being well spent and to the Company's advantage.

The Dividend.

In all the circumstances of these days, however, we felt it would not be right to dip into our reserves, so after very careful consideration the Board decided to recommend the payment of a dividend 5s. p.ct. per annum lower for the past half-year, or on the full year 2s. 6d. p.ct.

Before running through the Accounts there are two matters to which I wish to refer. The first is the paragraph in the Report with reference to the application to Parliament. This application has to be made by reason of the Company's 1927 Act, under which the Company is required to propose or to give an opportunity for revision of the basic price upon which our power in regard to the amount of dividend we pay is based. This and other clauses in the Bill will be explained at the Extraordinary Meeting.

The other matter is the presence here to-day of two employees as additional Directors of the Company.

You will remember that power was obtained in the 1927 Act just referred to for the election of Employee Directors, and in September last a scheme was submitted to and approved by you. The election took place in December, and I am pleased to say that considerable interest was displayed by the Co-Partners. Eighty-two p.ct. of the employees voted, and ninety p.ct. of the total possible votes were recorded. The successful candidates—Mr. Stanley Ernest Eady and Mr. James Wickens—have taken their seats at the Board, and are present here to-day. I have had considerable experience over a great number of years of Employee Directors on the Boards of other Companies with which I am associated, and I can confidently predict that it will be to the advantage of this Company also that representative employees should be associated with the Directorate.

The Notice calling this Meeting refers to a Resolution to be submitted asking you to consider and approve a proposal to vary in a small but desirable degree a detail of the scheme for the election of these persons. This will be explained when the Resolution is moved.

The Accounts.

Turning to the Accounts you will notice in the Capital Account (No. 3) that new and additional Prepayment Meters and Fittings were installed to the net value (after depreciation) of £5339 6s. 1d., but credits in respect of a reduction in the number of services, meters, and stoves, amounting to £10,663 11s. 4d., leaves a net credit of £5324 5s. 3d.

I have already explained the reasons for the increase in the expenditure and reduction in the Balance of Profit, and I do not think there is any other item that calls for comment. The working results are excellent, and reflect a great deal of credit on the managers and the staff associated with them. The Residual Receipts show a good average yield. This applies to the yield of gas per ton and the yields of products, especially coke, and also tar, which to-day is quite a good market. Unfortunately, the same cannot be said of the ammonia market.

From the Net Revenue Account it will be seen that the amount available for payment of Dividend and Interest is £186,031 18s. 8d. Deducting the Dividend for the first half of the year, £62,198 8s., and Debenture and other Interest, £24,032 6s. 9d., leaves £99,801 3s. 11d.

The Dividend recommended for the second half of the year amounts to £59,606 16s., and the carry-forward will be £40,194 7s. 11d., or £8642 17s. 7d. less than last year.

The large item of £8170 19s. 8d. has been written off the Reserve Fund for Depreciation of Investments. These Investments, which are included with the Co-Partnership Stock held by the Company in the Balance-Sheet under the heading of "Amount Invested," have been written down to a price at or below the market value as at Dec. 31.

There is one other matter I ought to mention. Without in any way calling into question the competence and authority of the Company's Auditors, the Board felt it would be desirable to follow a precedent which obtains elsewhere, and provide for a completely independent oversight of the Accounts by a Firm of Public Accountants, and they are pleased to be able to report that Messrs. Deloitte, Plender, Griffiths, & Co. have consented to act in that capacity to the Undertaking. It is a great relief to me and my colleagues to know that we shall be strictly supported by a firm of that character and standing.

The Deputy-Chairman (Mr. Arthur M. Paddon, M.Inst.C.E.) seconded the motion for the adoption of the report and accounts, and there being no questions asked, the Resolution was put to the meeting and carried unanimously.

Dividends.

The Chairman then moved:

> That, pursuant to the recommendation of the Board of Directors, a dividend be declared for the half-year ended Dec. 31, 1931, at the rate of £2 17s. 6d. p.ct. on the ordinary stock of the Company, less income-tax, payable on Feb. 15, and that warrants for the same be forwarded by post to the proprietors.

This was seconded by the Deputy-Chairman and agreed to.

Employee Directors.

The Chairman thereafter moved:

> That the variations in Rules 7 and 8 in respect of the scheme for the election of Employees' Directors now submitted be and the same are hereby approved.

He said: The variations which the Resolution proposes should be made are very slight, and the sole object is to simplify the arrangements for holding the elections. As originally drafted, it was incumbent to post the names of all co-partners eligible for election as Directors at the works, but it was found that quite a large number did not approve of the publicity thus given. It has now been arranged, by re-drafting Rule 7, that a copy of the notice of election shall be sent by post to every employee possessing the necessary qualifications, and only the names of those employees offering themselves as candidates will be posted up in the works, depôts, and offices.

The Deputy-Chairman seconded the Resolution, which was agreed to.

Re-Elections.

The retiring Directors, Messrs. F. H. Jones, M.Inst.C.E., and Frederick McLeod, J.P., and the retiring Auditor, Mr. G. W. Ilsley, were re-elected.

EXTRAORDINARY MEETING.

The Secretary having read the notice convening an Extraordinary Meeting to consider the Company's Bill in Parliament,

The Chairman said that, as he had explained at the preceding meeting, the primary reason for the application to Parliament was due to a clause in the Company's Act, 1927, which provided that in the Session 1932 the Company was required to propose a revision, or to give an opportunity for a revision, of the basic price of gas.

This basic price (which in the Company's case was 11d. per therm) was the price at which, if the balance standing to the credit of the Net Revenue Account permitted, increments of dividend beyond a basic rate of 5 p.ct. might be paid dependent on the amount saved to the consumers by the Company selling gas below the basic rate.

Careful consideration had been given by the Board and its officials to the prevailing costs, and the Directors had come to the conclusion that the present basic price should not be varied. Subject to the shareholders' approval, it was not therefore proposed to suggest any change.

Opportunity had been taken to include other clauses in the Bill, and these the Chairman proceeded briefly to explain.

Preliminary clauses, he said, dealt with sale of stock. The present powers were governed by the 1902, 1918, and 1927 Acts, and while there was no intention, at the present time, of issuing any stock it was thought advisable that the various capital powers should be consolidated into one Act. The mode of issue and the conditions attaching thereto were set forth.

The next sections dealt with the purchase and cancellation of ordinary stock and the exchange of stock. The Company might apply moneys raised by the issue of debenture stock in purchasing ordinary stock, but there were limitations in respect of price and amount. Stock so cancelled was not to be re-issued. Then the Company might, by agreement with the holder of any ordinary stock, at any time exchange for such ordinary stock 5 p.ct. debenture stock of the Company. If Parliament approved these two clauses, it was proposed (when financial conditions were favourable and the Company had money available) to purchase ordinary stock on the market and, by the cancellation thereof, reduce the annual charge for capital, and to offer de-

benture stock in exchange for ordinary stock with the same object in view.

There followed a clause amending a section of the Act of 1927. This merely surrendered the right of issuing ordinary stock with a basic dividend of 6 p.ct., instead of the standard 5 p.ct. The right was of no use because the price would be pro rata to 5 p.ct. stock, and it would not be desirable to have a stock of a different basic value.

Charges for Prepayment Supplies.

He came now to the really important clause in the Bill, with regard to which there had been displayed what perhaps he might term a certain want of knowledge on the part of the authorities. Under the Metropolis Gas (Prepayment Meter) Act of 1900 there were settled for London regulations in regard to the supply of gas by prepayment meters, and these prescribed for the first time the conditions under which charges for prepayment supplies should be made. Whereas the ordinary consumer paid for his meter and any appliances he might need, the prepayment consumer had these things provided for him and paid a rental which at the present time was 2d. per therm, in addition to the ordinary price of gas. This worked very well in the early days of the prepayment meter system, but as that system extended the conditions became a little unbalanced. The prepayment system had become popular in a greater number of what he might call the better-class homes than was originally contemplated, and so they had people who were very large consumers of gas on the prepayment system. Under the present arrangement, they had to go on charging them the same 2d. extra whatever their consumption might be. On the other hand, they had consumers who used very little gas, and in regard to whose consumption the system did not pay. Thus they had two sets of disturbing conditions. In some cases the consumer was paying more than he should, and in others he was paying less than he ought to. The Bill therefore proposed to raise the maximum chargeable to the prepayment consumer from 2d. to 3d. per therm. But this additional charge would only be made up to a certain consumption of gas by the individual consumer, beyond which he would pay the ordinary price for gas and no more. They would then be charging the small consumer more nearly what he ought to be paying for his service, while in the case of the larger consumer they would arrive at the point when, having paid for his apparatus, he would get further quantities of gas at the ordinary price.

The next clause of the Bill was unusual. It provided that the Directors in special circumstances might "appoint a person possessing professional, technical, commercial, financial, or scientific knowledge advantageous to the conduct of gas undertakings as an additional Director of the Company." As an example of the value of this clause, they might suppose, for instance, that their Engineer desired to retire from active service with the Company. It would be unfortunate if he had at once completely to sever his association with them. This clause would provide a means of bridging over the period between the retirement of such an officer and the appointment of his successor. It would be a temporary appointment only. So far as he was aware, the proposal was not exactly a new one, but it had been drafted in the interests of the undertaking.

Among other clauses was one to enable the Company to pay an interim dividend in place of a half-yearly one, and another to give them power to invest in securities of other companies, &c.—provided that the aggregate amount applied by the Company for the purpose of this section, and remaining so applied, should not at any time exceed one-sixth part of the authorized capital of the Company for the time being.

He concluded by moving a resolution approving of the Bill, which was seconded by the Deputy-Chairman and agreed to.

Votes of Thanks.

Mr. R. W. Edwards, proposing a vote of thanks to the Chairman and Directors, remarked that this duty was a pleasurable one, and one which represented the feelings of the stockholders, who were greatly interested in the affairs of the Company. By the Chairman and his colleagues the interests of the shareholders were being well looked after. The Gas Industry as a whole was making an extraordinarily good showing having regard to the fact that the year 1931 had been a mild one so far as weather conditions were concerned, in addition to the great depression in trade. This struck him very forcibly. It demonstrated to the investing public that the Industry was more than standing up to its competitors. A very encouraging point in the Chairman's speech was the fact that during the past two years, notwithstanding the fierce competition experienced in regard to electric lighting, the Company had sold outright to consumers no fewer than 100,000 gas lighting fittings. This proved that the Company had not lost its grip of the situation. On behalf of the shareholders, he begged to tender their hearty thanks to the Board for their conduct of the affairs of the Company during the past year.

The vote of thanks was seconded by Mr. G. W. Ilsley, and carried unanimously.

The Chairman, in acknowledgment, said the Board were grateful for the resolution just passed. They were united in their efforts to do all they could to maintain the reputation which, in the case of the Commercial Gas Company, went back so many years. Although a small Company, it was a pioneer in many respects. It was the first, he believed, to adopt the sliding-scale, and as time went on it would not be found backward in meeting conditions which were very different from those it had had to meet in the past. Whatever the Board might do in their collective capacity, they could only lay down the policy. The work of carrying it out rested with the officers and staff. The more he saw of the work done by the officers and staff of the Commercial Gas Company, the more he was impressed, not only by what they had achieved, and were achieving, but by their potentiality for the future. In one respect the requirements from the staff had changed, and this was in regard to the sales of gas and products. The technique of the engineer had been handed on from generation to generation, but the technique of the salesman was a newer one; and the surprising thing was that so many persons in their employ exhibited the peculiar qualities always associated with good salesmanship. It was pleasing to him to be able to say how appreciative the Board were of the work done. All the other efforts of the Company would be useless without a tip-top selling organization. He therefore suggested that the vote of thanks to the Board be supplemented by one to the officials and employees of all ranks for their devotion to the affairs of the Company during the past twelve months.

Mr. F. J. Bradfield, acknowledging the vote on behalf of the staff, said he had returned thanks for this vote for many years, and he assured the proprietors that it was greatly appreciated. At the present time there was a keenness among the staff which had never before been equalled. He mentioned this because the advent of the 1927 Act and the Statutory Co-Partnership Scheme had revolutionized the ideas of the employees. The whole personnel of the Company were closely interested in their work. Month by month he had evidence of this in the suggestions and letters he received indicating that the employees were exercising their judgment in the interests of the Company.

The Chief Engineer (Mr. A. E. Williams, M.Inst.C.E.) also acknowledged the vote on behalf of the technical staff.

South Suburban Gas Company

ANNUAL GENERAL MEETING

The Annual Ordinary General Meeting of the proprietors of the South Suburban Gas Company was held at the Hotel Metropole, Northumberland Avenue, London, W.C. 2, on Friday, Feb. 12, 1932. The Chairman of the Company (Dr. Charles Carpenter) presided.

The Secretary (Mr. Wilfrid Wastell, F.C.I.S.) read the notice convening the meeting.

The minutes of the preceding annual general meeting were taken as read, and the Seal having been affixed to the Register of Proprietors, the Secretary read the certificate to this effect.

The Chairman, proposing the adoption of the Directors' Report and Statement of Accounts for the year ended Dec. 31, 1931, said: I shall have to curtail my remarks considerably this morning in order to leave time to deal with the agreements and the Bill which has been promoted in respect of the purchase of the undertakings of the Tonbridge and the Sevenoaks Gas Companies.

A Good Increase in Sales.

With regard to the working for the past year, I think I might describe that in a nutshell if I say that we have had an unusually busy year and a somewhat less profitable one. In the first case, we had a good increase in the sale of gas, amounting to 5½ p.ct. for the year, but this figure is built up of variations which have not conduced to the best working results. I have not a chart and I will not trouble you with monthly figures, but I will give the quarterly figures. For the March quarter of last year our increase was just 10 p.ct.; for the June quarter, 7 p.ct.; for the September quarter, 2½ p.ct.; and for the last quarter, 1¾ p.ct. In other words, the equipment we provided for the first half of the year did not yield the usual or expected return for the second half. The figures are encouraging, however, as showing the potentialities and expansibility of the undertaking.

To meet the requirements thus briefly indicated we have had to incur a considerable expenditure of capital, and this cannot be immediately fully remunerative since in some of our areas the country is very sparsely built over. In the case of mains these requirements have absorbed £66,000. In addition, we have spent £44,000 on the provision of stoves and meters, which again is a very good measure of the expansion of the Company's operations. The balance of the expenditure of capital was applied mostly to the purchase of new showrooms and some other property, and partly to the improvement of our

gas production and storage plants. We have now, or we shall have shortly, thirteen establishments which we describe as showrooms, but which are really in the nature of local offices, very much like the local offices that are provided by the banks in the various centres.

Monthly Collection of Accounts.

There is an interesting point about our consumption, and that is that the increase is due largely to those whom we know as the " ordinary " consumers. The use of gas by the ordinary consumer has grown by 8 p.ct., whereas the prepayment expansion has been at the rate of slightly over 1 p.ct. The number of prepayment supplies has been almost stationary, and the great increase has been among the ordinary consumers. It is quite possible that this is attributable in part to the quality of the houses now being built, but it may also be due to the fact that we have in operation a system of monthly collection of accounts. This provides a mean, as it were, between the payment for gas, in the one case, before it is used, and, in the other case, some weeks after it has been used.

The great increase in motor traffic, to which undoubtedly is due the development of a large portion of our southern and south-eastern area, has brought about one disadvantage in regard to our mains system, and we feel it severely in the case of a district which covers so large an area. It is that we can no longer depend upon having our mains in the centres of a great number of these roads, owing to the fact that present practice of road making is to construct a concrete foundation, and it is very difficult, therefore, to get at the mains either for occasional repairs or for connecting new consumers to the existing mains. So that, although in other respects the consumption may not warrant it, yet in the long run we find it cheaper to put a main down on each side of the road, under the footway, so avoiding the necessity for disturbing these modern and expensive roads. It is partly due to this additional expenditure that our length of mains has now reached practically 800 miles.

Unaccounted-for Gas.

I ought to put you in possession of all the facts, and I do not think I leave this question of mains without saying that our figure in respect of unaccounted-for gas is not altogether satisfactory, especially when we compare it with the results achieved by other undertakings working under somewhat similar conditions. We have now, however, a newly-appointed Mains Engineer, who is devoting special attention to this matter, and I am very hopeful that the figures for the current year will show a substantial improvement as the result of the work which is being undertaken by him and his staff.

With regard to our manufacturing stations, we have not considered the time opportune to close down either at Bromley or Dartford; therefore, these plants are being maintained, and adequately maintained, for their normal purposes. At Sydenham, on the other hand, we have been spending a good deal on repairs. We have been improving our screening and sizing apparatus for coke, and in connection with that we have erected some producers for the manufacture (from the coke smalls inevitably produced by the breaking process) of heating gas for our retorts. To-day nothing but the most up-to-date plant, special attention to the quality of the coal we purchase, suitable carbonizing plant, and so on, will produce a coke which satisfies to the full the requirements of our consumers and enable us to compete with coke supplied from other sources. We can no longer buy coal just because it is black, place it into the retorts and be contented because it makes so many cubic feet of gas; in purchasing our coal to-day we have to consider not only what it will yield in gas—which is a comparatively simple matter—but something which is still more important—*i.e.*, what it will give us in the quality of the coke produced.

We have also executed substantial repairs to our gasholders at Sydenham, and the contractors have almost completed the construction of a new one at Crayford, while another is in course of erection at Belvedere. Now that gas is being used increasingly for heating purposes, climatic variations in the demand for gas exceed very often the seasonal ones, and under the present conditions, which are not likely to alter, storage facilities must keep pace with the growth of our production.

With regard to the dividend, while we are authorized, under our governing Acts, to pay in respect of the past half-year a dividend higher than that which your Directors propose, the fact remains that, for the reasons I have given, we did not earn it, and we felt there was no justification for encroaching, even temporarily—*i.e.*, during the past half-year—upon reserves which would with advantage be increased rather than reduced.

The other matter in the Report relates to the purchase of the Sevenoaks and Tonbridge Companies' undertakings, as well as to the consequent Parliamentary Bill, which I will deal with at the Extraordinary Meeting which is to follow this meeting.

I do not propose to add to these few remarks now, unless any proprietor desires to ask any questions thereon, in which case I shall endeavour to answer as fully as possible.

I now formally move:

> That the Report and Accounts now presented be received and adopted, and the Report entered on the minutes.

Mr. Benjamin R. Green (Deputy-Chairman): I beg to second that resolution.

There was no response to the Chairman's invitation to the proprietors to put questions concerning the Report and Accounts, and the resolution was carried.

The Dividend.

The Chairman: I have now to move:

> That a dividend on the Ordinary Stock for the half-year ended Dec. 31, 1931, be now declared at 3 p.ct., less income-tax, and that the warrants for the net amounts be forwarded on the 25th inst. to the registered addresses of the proprietors.

Mr. Benjamin R. Green (Deputy-Chairman): I beg to second that resolution.

The resolution was carried.

Transfer of the Sevenoaks and Tonbridge Undertakings.

The Chairman: I have now to move:

> That the agreements dated the 26th November, 1931, and made between the Sevenoaks Gas Company and the Company and the Tonbridge Gas Company and the Company respectively, for the purchase by the Company of the undertakings of the Sevenoaks Gas Company and the Tonbridge Gas Company, be and are hereby approved.

It would be convenient, perhaps, before asking the Deputy-Chairman to second the resolution, that I should make one or two remarks concerning it. I think it is pretty clear that what we call the " grid " will in future make increasing demands upon the resources of the smaller undertakings, and we ourselves are particularly constituted, I think, for handling the duties which would thereby be entailed by taking them over. There are two agreements, and I am afraid I shall have to devote some time to them, because it is my duty to leave no uncertainties in your minds as to what these agreements really are.

The first is an agreement made in November last between the Sevenoaks Company and the South Suburban Gas Company. The first clause provides that this Company shall purchase the property and contracts of the Sevenoaks Company. The next requires this Company to accept the title of the Sevenoaks Company to the property, assets, &c., and the third provides that the date of transfer is to be either Jan. 1 or July 1 next after the passing of the Bill. The consideration for the sale and purchase shall be as follows:

(*a*) The issue by the South Suburban Company to the holders at the date of transfer of " A " or " B " shares of the Sevenoaks Company in exchange for such shares of 5 p.ct. preference stock of the South Suburban Company at the rate of:

(i) Two hundred and fourteen pounds four shillings (nominal value) of such stock for each ten such " A " shares, and

(ii) Fifteen pounds (nominal value) of such stock for each such " B " share,

and so on in proportion for any greater or less number of such " A " or " B " shares.

The debenture holders will receive South Suburban Debenture Stock.

The next sub-clause states what is to be done in the case of fractions of the stock. The next clause refers to the obligation on the part of the South Suburban Company at the date of transfer to pay what dividends may have accrued on the Sevenoaks stock prior to the date of transfer. The same provision is made with regard to debenture stock. The Sevenoaks Company carries on its business after the date of transfer until the South Suburban Company is in a full position to take it over. The South Suburban Company, by the next clause, agrees to meet the liabilities of the Sevenoaks Company, and that Company agrees to enter into no new contracts except those which are necessary to carry on its business. On the date of transfer the Directors of the Sevenoaks Company retire, and they receive seven years' compensation for loss of office, such seven years' compensation to be based upon the year preceding the year in which we began negotiations—*i.e.*, 1930. The Auditors of the Sevenoaks Company receive, in a similar way, three years' purchase, based, as before, on the year 1930. The South Suburban Company agrees to take over and employ such of the staff of the Sevenoaks Company as it desires to keep, and the clause in this connection also provides that if any staff officer shall not be taken over, or if any staff officer, after being taken over, has his services dispensed with or suffers any diminution of salary within five years, then the South Suburban Company shall pay to such staff officer by way of compensation for loss of office or for pecuniary loss such amount as may be agreed upon or as may be settled under the terms of the Arbitration Act. So that there is ample provision for taking them over, but if they are not taken over they will receive the compensation which practice provides. The next clause provides that any compensation to be paid shall be paid within a month; the staff officers are those whose names appear on a schedule attached to the agreement.

In addition to the provision for staff officers there is provision for those whom I may describe as the rank and file, by which they receive compensation under the scheme settled by the Joint Industrial Council. The staff to be taken over, as provided in the next clause, are to work under the South Suburban conditions. Their length of service with the Sevenoaks Company is to be included as part of the future service in the South Suburban Company, and any pensions which the Sevenoaks Company is already paying are to be paid as before. The next proviso states that anyone who is not eligible to join the South

Suburban Pension Fund will receive the same benefits as he would have received had he remained in the Sevenoaks Company. Any money, policies, or securities, forming part of the pension fund of the Sevenoaks Company, will be transferred to the similar fund of the South Suburban Company.

The next clause provides that the agreement is to be subject to the consent of the proprietors of both undertakings. The South Suburban Company agrees to promote a Bill in Parliament in the ensuing session and to pay the cost of it. The next clause provides that arrangements are to be made by which certain differential prices are to be maintained. There is also provision for winding up the Sevenoaks Company. If the Bill fails to pass, or if material alteration is made by Parliament, the respective parties have the right to cancel the agreement.

Any difference under the agreement is to be referred to a Counsel nominated by the President of the Law Society. The costs and charges of the Bill and the preparation of the agreement, the carrying out of the transfer, and the winding up and dissolution of the Sevenoaks Company are to be paid by the South Suburban Company, and in witness thereto the respective parties have set their hands. The Common Seal of the Sevenoaks Company was affixed in the presence of the Chairman (Mr. David Pugh), the Vice-Chairman (Mr. J. W. Hills), and the Secretary (Mr. J. H. Donaldson).

The next agreement, with the Tonbridge Gas Company, is mainly on similar lines, but there are one or two respects in which it differs. I will go through the agreement and enlarge on those matters in respect of which it differs substantially from the Sevenoaks agreement. It provides that the South Suburban Company is to take over the Tonbridge Company and all its plant. The second clause agrees the Tonbridge title, the next defines the time of purchase, and the next deals with the consideration. I will read the latter in full. It provides that:

"The consideration for such sale and purchase shall be as follows:

(*a*) The issue by the South Suburban Company to each person being the holder at the date of transfer of 'A' 10 p.ct., 'B' 7 p.ct., 'C' 5 p.ct., 'D' 7 p.ct., or 'E' 7 p.ct. Ordinary Stock of the Tonbridge Company in exchange for such Ordinary Stock of 5 p.ct. Preference Stock of the South Suburban Company as follows:

(i) To every holder of such 'A' Ordinary Stock, Two pounds Sixteen shillings (nominal value) of such Preference Stock for each One pound (nominal value) held by him of such 'A' Ordinary Stock;

(ii) To every holder of such 'B,' 'D,' and 'E' Ordinary Stock, Two pounds Four Shillings (nominal value) of such Preference Stock for each One pound (nominal value) held by him of such 'B,' 'D,' and 'E' Ordinary Stock;

(iii) To every holder of such 'C' Ordinary Stock One pound (nominal value) of such Preference Stock for each One pound (nominal value) held by him of such 'C' Ordinary Stock,

and so in proportion for any less amount of any such Stocks."

Then, as to the Debenture Stock, there is provision for the issue by the South Suburban Company to each person being a holder of 4 p.ct. Perpetual Debenture Stock in the Tonbridge Company, of 5 p.ct. Perpetual Debenture Stock for his 4 p.ct. at the rate of £1 for each £1 5s. he already holds; the issue by the South Suburban Company to every person being the holder of 5 p.ct. Redeemable Debenture Stock in the Tonbridge Company, on the basis of £1 for £1, of 5 p.ct. South Suburban Redeemable Debenture Stock to be created for the purpose. Fractional parts are to be dealt with as in the case of the other undertaking.

The next clause provides that the Preference and Debenture Stock are to be of the same class as the respective Stocks already issued by the South Suburban Company.

There is the same proviso with regard to the payment, after the date of transfer, by the South Suburban Company, of the dividends which may have accrued to the Tonbridge Company before the date of transfer. The Tonbridge Company is to carry on until the date of transfer. Also, it is required not to incur any liabilities beyond those which are essential, except with the consent of the South Suburban Company, which consent is not to be withheld unreasonably. The South Suburban Company agrees to discharge all contracts and liabilities which have been entered into by the Tonbridge Company.

The Directors of the Tonbridge Company are required to carry on until the date of dissolution, but they will receive no payment beyond the payment for loss of office, which is to be calculated in the same manner as the compensation to Directors of the Sevenoaks Company. The Auditors also are to be compensated in a manner similar to that applying to the Auditors of the Sevenoaks Company, and the South Suburban Company is to take over and employ the staff on and from the date of transfer. There is a proviso with regard to any staff officer not taken over or who, after being taken over, shall have his services dispensed with within a period of five years, or who suffers any diminution of his salary or emoluments within that period. In those circumstances the Company is to pay compensation, and in case of disagreement the matter shall be referred to arbitration. The compensation may be by lump sum or annuity. If it is a lump sum it is to be paid within a month, and if an annuity it is to commence within three months. The procedure, therefore, is similar to that applying in the case of the Sevenoaks Company, and the list of staff officers is contained in a schedule. The only withdrawals from or additions to that list are to be such staff officers who may retire from the service of the Tonbridge Company or who shall, with the consent of the South Suburban Company, be appointed to the staff of the Tonbridge Company after the date of the agreement.

Employees other than staff officers are to receive the compensation provided by the Joint Industrial Council in the event of their not being taken over. Nothing in the agreement is to be deemed to require the South Suburban Company to employ any staff officer or other employee taken over in the same office or capacity as that in which he was employed by the Tonbridge Company. The officers and other employees in the Tonbridge Company shall be eligible to join the Co-Partners' Superannuation Fund of the South Suburban Company on the same conditions as those of the South Suburban Company. The South Suburban Company is required to continue to pay pensions, allowances, and so on, in the same way and on the same scale as those provided by the Tonbridge Company, and in the case of those who have any pension rights under the Superannuation Scheme at Tonbridge, but are not eligible to become members of the South Suburban Superannuation Fund, they shall be entitled to continue to receive the pensions and allowances they would have received had they continued in the service of the Tonbridge Company. Again, there is provision that any moneys or policies forming part of the co-partnership, pension, or other schemes for the benefit of the employees are to be transferred to the South Suburban Company. The agreement is subject to the approval of the proprietors of the South Suburban Company.

Then there is the requirement that the South Suburban Company shall at its own expense promote a Bill, and there is a provision with regard to the price of gas in the Tonbridge area. The Bill is to contain such provisions for the winding up and dissolution of the Tonbridge Company as the Tonbridge Company may approve. There is another provision, to the effect that if the Bill shall fail to pass into law before the end of the year 1933, this agreement, except clause 20 (which provides for the payment by the South Suburban Company of the costs in connection with the agreement and the Bill) shall become void and shall have no effect, and if any material alteration is made by Parliament in the said Bill affecting the subject-matter of the agreement, then either party may give notice to withdraw. The agreement is subject to the approval of Parliament, and any differences between the South Suburban and the Tonbridge Companies concerning the agreement are to be referred to Counsel to be nominated by the President of the Law Society.

I think I ought to say that in the contracts which have been entered into there is a special clause pertaining to one of the officials of the Sevenoaks Company. This gentleman has an agreement under which, if his service with the Sevenoaks Company is brought to an end as a result of the Sevenoaks undertaking becoming amalgamated with another undertaking, he is to be paid a sum equal to 10 years of the emoluments he receives. In that respect he is dealt with in a manner somewhat different from that applying to the other staff officers and employees, whom it is assumed will serve the South Suburban Company in a manner similar to that in which they have served the Sevenoaks or the Tonbridge undertakings.

If there are any questions you would like to put with regard to these agreements I will endeavour to answer them. After this meeting we are to have an extraordinary meeting in order to approve the Bill which is based largely on these two agreements, but which contains in addition some other clauses of importance to the undertaking. I will ask the Deputy-Chairman to second the resolution approving the agreements.

Mr. BENJAMIN R. GREEN (Deputy-Chairman): I have pleasure in seconding the resolution.

No questions were asked by any of the proprietors, and the resolution was carried.

RE-ELECTION OF RETIRING DIRECTORS.

On the motion of Mr. HAROLD GUNDRY, seconded by Mr. FRANK H. JONES, the meeting re-elected Mr. Frank Bush and Mr. Arthur M. Paddon, M.Inst.C.E., to the Board.

Mr. PADDON briefly returned his thanks for his re-election, and assured the proprietors that he would continue to serve them to the best of his ability.

RE-ELECTION OF RETIRING AUDITOR.

On the motion of Mr. E. A. PIERCE, seconded by Mr. W. WEBSTER, the meeting re-elected Mr. Alfred Morland, F.C.A., an Auditor, and authorized an increase in the Auditors' fees by £50 per annum.

Mr. MORLAND returned his thanks.

This concluded the business of the Ordinary General Meeting.

EXTRAORDINARY GENERAL MEETING.

An Extraordinary General Meeting was then held for the purpose of considering the provisions of the Bill providing for the transfer to the South Suburban Company of the undertakings of the Sevenoaks Gas Company and the Tonbridge Gas Company, and for other purposes.

The SECRETARY (Mr. Wilfrid Wastell, F.C.I.S.) read the notice convening the meeting.

The CHAIRMAN: I now have to move the following resolution:

> That the Bill now submitted, entitled "A Bill to provide for the transfer to the South Suburban Gas Company of the undertakings of the Sevenoaks Gas Company and the Tonbridge Gas Company, and for other purposes," be and

the same is hereby approved, subject to such conditions, alterations, and variations as Parliament may make therein and the Directors may approve.

The main objects of the Bill are to increase our powers with regard to the issue of capital and to give effect to the agreements I have dealt with at the annual general meeting. With regard to capital, you will see from the statement of accounts that while we have unexhausted powers to issue £307,000 odd of capital, this account is already overdrawn to the extent of £177,000. It is obvious, therefore, that quite apart from the proposed transfer of the two other undertakings, our margin of working capital is too small. As to the undertakings of the two Companies, I do not think I need say very much more. It is fairly clear, I think, that the grid may be a menace to the smaller undertakings, and it is quite certain that the smaller undertakings to-day are not nearly so completely or fully equipped as the larger undertakings, which have been experiencing keen competition for a great many years past. The area of North-West Kent is developing rapidly, and in view of the increased attractions to industry in the South of England it seems likely to go on. For this and other reasons, your Board decided to enter into negotiations for the purchase of the two undertakings on the South Suburban Company's southern boundary, and I must now go through the clauses of the authorizing Bill which gives effect to the agreements we have entered into provisionally. Most of you no doubt have in your minds a very fair picture of the County of Kent and its future possibilities, for more reasons than one, as a manufacturing district. You know the development which has been going on since the war in one way and another, and it is desirable that we should be in a position to serve the area effectively if and when it is developed.

The CHAIRMAN then indicated the purposes of the clauses in the Bill concerning the transfer of the Sevenoaks and Tonbridge undertakings, to give effect to the terms of the agreements already mentioned.

With regard to stocks, the CHAIRMAN said: There is a clause giving the Company power to create the stocks which are necessary for the purpose of the transfer. The stocks are to be deemed fully paid, and the new redeemable stock is to be redeemable on the same lines and conditions as the old redeemable stock, and the new stocks are to rank for interest in exactly the same way as the old ones. Any stocks created under this Act are part and parcel of, and rank *pari passu* with, the existing ones. Then there is a proviso for dealing with fractional parts of the two stocks. The next clause requires trustees who may hold either of them to accept in exchange or in lieu thereof the new stocks issued by this Company. The next provides for the exchange of certificates, and that until the new certificates are issued the present stockholders' title is accepted. The next refers to the validity of certain stock transfers, and the next provides that the accounts of the two undertakings to be transferred are to be made out prior to the date of transfer. The next provides that the powers of the South Suburban Company apply to the Sevenoaks and Tonbridge districts on the date of transfer, except as provided. The Acts and Orders of the Sevenoaks and Tonbridge Companies are repealed, except in certain cases which are set out. Any pending action is not to be abated, but is to be taken over by the South Suburban Company, and contracts entered into by the other Companies are to be honoured by the South Suburban Company. Outstanding debts are to be recoverable, books of both Companies are to remain evidence, and the officers of both Companies are to be accountable for the books. The books of both Companies are to be evidence as to the holders of the shares or stocks. The Reserve, Renewal, and Insurance Funds of the two Companies are to be transferred to the South Suburban Company, as are also their Pension and Co-Partnership Funds. There is provision for differential prices in the Sevenoaks area and the Tonbridge area, and there is a clause dealing with the price of gas to the Urban District Council of Tonbridge. The South Suburban Company are to be registered as the holders of any stocks now held by the two other Companies. Another clause deals with calorific values, and others with the compensation to Directors and Auditors, the taking over of the officers of the two Companies, and arrangements with regard to superannuation as set out in the agreements.

There is a clause giving power to construct works for making gas and residual products. Another states that the lands which were transferred to the South Suburban Company by virtue of its 1929 Act, and on which the Company may maintain, erect, alter, improve, and renew gas-works and work up and convert residual products, are described in Part II. of the Fifth Schedule.

Now I come to the capital of the South Suburban Company. As from the date of transfer the authorized capital of the Company shall be increased by the amount necessary to effect the purchase of the two undertakings. Beyond this, the capital can be increased by the sum of £500,000. Certain provisions of the Company's Act of 1928 apply to this Act, but I need not go into that matter; they relate to the sale of stock by auction or tender, and other matters. The Company may borrow, if it desires, for the purpose of the purchase and without a certificate of a Justice of the Peace. There is also a provision with regard to the calculation of the consumers' share under the 1928 Act. That Act provided for the application of the basic price principle in substitution for the old sliding-scale Act, and a clause in this new Bill deals with the arrangement for maintaining the position undisturbed when taking over the two undertakings.

The next clause is an important one. It provides that the Company and any company, body, or person authorized to supply gas under statutory powers may, with the approval of the Board of Trade, enter into and carry into effect agreements for the amalgamation, purchase, leasing, or joint working or management of their respective undertakings, including agreements for or in connection with the joint use of buildings, works, or plant, and the provision or adaptation of buildings, works, or plant for such joint use, and for the setting up and joint use or carrying on of establishments for research, and generally for any purpose which will, in the opinion of the parties to any such agreement, conduce to the more economical or efficient manufacture, distribution, and sale of gas, or manufacture, working up, conversion, or use of residual products. Then there is a proviso covering the obtaining of the Board of Trade's approval. The next clause gives the Company authority to enter into arrangements with any company which may be formed for the special purpose of laying mains. Supposing any company had the idea of laying new mains on an extensive scale, we could under this clause enter into arrangements with them for carrying out that purpose. That power is again subject to the Board of Trade's approval.

The next clause provides that the Company may purchase or acquire and hold or dispose of any shares, stock, mortgages, debentures, or debenture stock of, or lend money to, any company, body, or local authority where such company, body, or local authority (i) are themselves engaged in the manufacture, distribution, or sale of gas or residual products; or (ii) carry on or are about to carry on any undertaking, business, or process of manufacture for or in connection with which residual products or other products manufactured or dealt in or authorized to be manufactured or dealt in by the Company or the products arising from the working up or conversion of such residual products are or can be used; or (iii) carry on or in connection with the production, carbonization, gasification, sale, or distribution of coal, coke, or oil, or of products arising therefrom, or any of those matters; or (iv) carry on or about to carry on any undertaking or business for or in connection with the making, producing, or dealing in appliances used in connection with the distribution or use of gas.

Having asked for this latitude of association with undertakings which in one way or another may be essential or useful in the carrying out by this Company of its obligations, there is a limitation with regard to the amount of capital which may be applied under these circumstances, as set out in the Bill. It is provided that the aggregate amount applied by the Company for the purposes of this section and remaining so applied at any time shall not exceed one-tenth of the nominal amount of the issued capital of the Company for the time being; and the amount so applied in the case of any one company, body, or local authority and remaining so applied at any time shall not exceed one-twentieth of such nominal amount, except with the approval of the Board of Trade. Then we have to give notice (of any application to the Board of Trade) to certain local authorities.

Consideration for payment in these cases may be by various stocks—ordinary shares, debentures, or debenture stock. There is provision for ascertaining the values of these stocks if they are used for the purpose of paying for such considerations. Another clause empowers the Company to exchange stock or to lend money for these purposes.

Then there is another provision which is new in our case. It is that, notwithstanding anything contained in any Act relating to the Company, the Directors may appoint a person possessing professional, technical, commercial, financial, or scientific knowledge advantageous to the conduct of gas undertakings as an additional Director of the Company. It is also provided that any person so appointed shall receive the same emoluments as those received by the other members of the Board, and that the appointment may be for such period as the Board may desire. The object is to give the Board the opportunity, if the occasion is suitable, of securing the association with the Board of some gentleman, either temporarily or for a definite period, who might be of use to the Board in special circumstances. We might, for instance, have on the Board an officer who is retiring from the Company's service, and whose knowledge and experience might be useful. Under the powers of this clause he could be appointed a Director for the time being, and he would continue in office while that special appointment lasted, and the Board, therefore, would have the advantage of his services during what might be described as the period of bridging over. But such a Director must have the same qualification as an ordinary member of the Board.

Other clauses in the Bill deal with the recovery of penalties, the recovery of demands, and the costs of the Act. Then the schedules are set out. The first sets out the capital of the Company; the second defines the Sevenoaks District; the third defines the Tonbridge District; the fourth sets out the various Acts and Orders relating to the Sevenoaks Company and the schedules thereto, and indicates which are gas lands and which are not; the various Tonbridge Orders are set out in a similar manner, and there are certain obligations with regard to the construction of works, protection for the railways, and certain obligations with regard to the maintenance of the roads. There is also the continuance of certain rights which the respective Companies have in the matter of the manufacture of apparatus, meters, and so on, and it ensures the transfer of those rights to the South Suburban Company in respect of these particular areas.

The last point I wish to deal with relates to scheduled lands

for the purposes of the South Suburban undertaking. The Fifth Schedule to the Bill schedules certain lands as gas lands in the Borough of Bromley, in West Wickham, the urban district of Erith, and a piece of land in the urban district of Northfleet. Part II. of the Fifth Schedule refers to the transference of lands, which had already existed as gas lands, to the South Suburban Company.

You may accept my assurance that these powers are all necessary, and the Board is confident that they will be in the general interest of the South Suburban Company.

Mr. BENJAMIN R. GREEN (Deputy-Chairman) seconded the resolution providing for the approval of the Bill.

There was no response to the Chairman's invitation to the proprietors to ask questions concerning the Bill, and the resolution was put to the meeting and carried.

VOTE OF THANKS TO THE BOARD.

Mr. E. A. PIERCE proposed a very hearty vote of thanks to the Chairman and his co-Directors for all the work they had done.

This was seconded by Mr. ALFRED MORLAND, and was carried unanimously.

The CHAIRMAN expressed thanks on behalf of the Board, and also on behalf of the officers and employees of the Company. They all appreciated very highly, he said, this expression of thanks, and looked to the future to justify the action they had been discussing at that meeting.

Croydon Gas Company

ANNUAL GENERAL MEETING

The Annual General Meeting was held at the Company's Offices, Katharine Street, Croydon, on Friday, Feb. 12, 1932—Mr. WILLIAM CASH (Chairman) presiding.

The SECRETARY read the notice convening the Meeting.

The Minutes of the Annual General Meeting held on Feb. 13, 1931, were read, confirmed, and signed.

The Register of Proprietors was duly signed and sealed.

CHAIRMAN'S ADDRESS.

The CHAIRMAN: It now becomes my pleasure to address you with regard to the Report which is in your hands and which has been duly circulated.

Dealing first with our own domestic affairs I would invite your attention to the capital account. You will observe we have issued certain capital during the year to the Oxted shareholders in satisfaction of the purchase price of their undertaking. In addition, there was certain redeemable stock which was issued at a time of great financial stringency in January, 1921, and therefore carried the high rate of 7 p.ct. We had the right to redeem that stock last year, and we did so, and it has been replaced by an equivalent amount of 5 p.ct. debenture stock which will effect a saving in future years of £2300 per annum. It is quite true, of course, that this year you have in addition to the actual change in the interest on the two stocks a premium on the redemption, but this we have been able to meet out of the current year's revenue, and we shall effect a saving which I think is eminently satisfactory. Beyond that, and the Oxted issue, there has been no issue of capital during the past year.

With regard to our own capital expenditure we have added substantially to our carburetted water gas plant, we have begun a new section of intermittent vertical retorts, and we have commenced the erection of a showroom at Oxted which, I am sure, will be a great advantage to our Oxted consumers.

CAPITAL EXPENDITURE.

Capital expenditure on new business cannot be avoided, and we have had to spend money during the year in this respect. For example, you will observe a substantial expenditure in respect of new mains. A satisfactory feature of our capital expenditure is that the capital charge incurred in relation to our business is not more than it was a year ago. In other words, this capital expenditure has been kept in line with the growth of our business. With regard to new mains we have laid a trunk main to give connection from the Croydon Works to the Oxted Works. Of course, at very considerable expenditure, but that is partly remunerated by the extra price for gas which we charge in Oxted. Gas was sent through from the Croydon Works to the Oxted Works for the first time on Dec. 23 last and has enabled us to put into force what we had in contemplation—namely, the raising of the calorific value of the gas supplied in the Oxted area to the same as it is in Croydon, 500 B.Th.U. In all, we have laid some 25 miles of mains during the year and also taken over from the Oxted undertaking 17 miles of their mains, making a total addition in our mileage for the year of 41 miles. The total length of the Company's mains is now 470 miles.

The next item in the capital account is new meters which are entirely in respect of new consumers, after deducting depreciation on the old meters, and represents an additional number of meters of 4147.

INCREASE IN GAS SALES.

Turning to the revenue account, I do not think I need detain you over that, because, following our usual practice, the comparative figures are inserted, and in order that they may be really comparative we have added the relative figures for those published in respect of 1930 so that you get the true comparison of Oxted combined with Croydon right through the year. Similarly, as a matter of interest, I would draw your attention to the figures of gas sales. You will see from those that the Croydon figures, without Oxted, for the first time have touched over 3000 million c.ft. With the Oxted figures our total last year was 3040 million c.ft. sold. Our total consumers now, including those from Oxted, number 82,278.

With regard to the prices of our materials, there is some slight increase in the net cost of coal after deducting residuals. We have done fractionally better with tar, but in respect of sulphate of ammonia the position is very much as I told you it was a year ago, and the present price of sulphate in competition with other production is such that we cannot make, nor can any gas company make, a profit on sulphate to-day. We have to deal with the ammonia, and therefore all we can do is to try to keep the resulting loss as low as possible.

GROWTH OF PUBLIC LIGHTING.

One other satisfactory feature I should like to refer to is that our consumption per consumer keeps steady in respect of both the ordinary and the prepayment consumer, and that is a difficult thing to do. We have, however, devoted a great deal of time and attention to try to encourage consumption on the part of the individual consumer, and thereby increase our business, apart from the business which we derived from new consumers. Our public lighting figures are distinctly satisfactory, and this is partly due to the outlying districts gradually becoming more urbanized. You will see that our public lighting on the year has gone up more than 6 million c.ft., and the number of lamps is greater than it was. Perhaps a still more satisfactory feature, and a matter on which I should like to congratulate the General Manager, is that we have very carefully gone over our public lighting costs, and I am pleased to say that, although we have to make special terms, we have made an undoubtedly satisfactory profit in respect of our public lighting.

Similar satisfactory results are shown by our showrooms, and from estimates which have been got out to show exactly what we are really doing with our showrooms, after allowing all reasonable expenses and charging them with an estimated rent and interest for the use of the materials employed, and all direct expenses, there is quite a reasonable profit on the business which we do. During the year, largely through the showrooms, we have put in very nearly 10,000 additional appliances. In this respect, in common with other gas companies, we are doing all we possibly can to improve the class of appliances which we sell. We believe that the right policy is to give the consumer the best possible article, and we rather emphasize the fact that the use of more modern appliances actually effects savings in the quantity of gas used, and increases the work which gas will do This will have the effect, temporarily, of decreasing the amount of gas which any particular consumer may use, but I am quite sure that the satisfaction of the consumer and the attention which we pay to his interests pay us in the end. In this respect again we have to acknowledge the work done by the manufacturers, who are not idle, but are always trying to bring out something new and something better in the way of appliances. There are many new uses being continually found for gas, many of them more particularly applicable to industrial purposes, and for a variety of trades and businesses gas is being continually pushed and made more use of every year.

Turning to what we have done in the way of repairs and renewals, you will see that there are certain charges which have fallen on the renewal fund. This fund has borne the cost of pulling down and rebuilding, to fit in with our vertical retorts, certain of our coke plant, and there is also a charge in respect of the old horizontal house pulled down to make way for the verticals which are now being erected. Plant repairs include the cost of an old holder now displaced, and a charge in respect of depreciation for another holder. You may observe that our charge for renewal of mains this year is somewhat high. That is a general tendency throughout the Industry. We have spent quite a substantial sum in gradually overhauling our mains and relaying them, and with regard to our charge for repairs of stoves and fittings you will see that that is heavy also, but it is really met by the rental which is shown on the other side of the account. Our policy here again is to give the consumers good service; and that accounts for this expenditure.

With regard to the balance-sheet, you will see that our pension fund has grown again during the year, and we have made additional investments on account of that fund to the extent of £18,000. These investments have been valued on Dec. 31;

while they stand in the books at £226,000, there was a depreciation, but not a substantial amount. The figure is about £20,000, but a great many of these investments are redeemable, and even since Dec. 31 there has been a recovery to the extent of over £7000. With regard to our own reserve and insurance funds, these on Dec. 31 were worth more than they stand in the balance-sheet, and they are therefore fully representative in value.

Turning to the future, we are probably committed to the erection of a holder in Carshalton to assist us in the distribution in that rapidly growing area, and there will be the usual expenditure on mains and stoves. We should also like to see the pensions fund more closely invested, and therefore you will not be surprised to hear that we shall have to make some issues of capital during the current year. I can only say this about that matter. I think that the capital when it is offered may be recommended both to yourselves and your friends as a thoroughly good and reliable investment. In fact, it is a very striking feature to my mind, in looking at the position in the financial world to-day, and seeing the terrible depreciation of certain classes of investments, how extremely well investments in public utility undertakings, including gas undertakings, stand. Our stocks are very much where they were a year ago, and are favourite stocks apparently to investors. Therefore, when we look to the future, in the issue of this further capital I think we may claim that the result of our past expenditure has been fully justified. Dealing with one matter alone, the intermittent verticals, of which the first house has been running for a complete year, the expenditure has been fully justified. Also, although this is not a very big matter of money, perhaps, we are in 1932 putting up a benzole recovery plant from which we shall make motor spirit.

Continuous Meter Reading.

There has been one innovation during the year, and that is we have instituted the system of continuous meter reading for our gas supplies throughout the area. This has meant that, instead of the work of metering being crammed into the particular quarters, with consequent rush and strain on the staff, meter reading goes on throughout the whole year at regular quarterly intervals, but not necessarily at quarter day. This system of meter reading may mean that a little more gas is charged for in one quarter than another, but, of course, it works out perfectly level over the year, and it has been a distinct advantage.

With regard to the price of gas, we see no immediate prospect of an increase in costs so far as we can judge at the moment, and I hope we shall be able to continue with the price to the consumer as it is to-day. As you know, with electricity, there there are various methods of charging; there are block systems, the system which gives special discounts for quantities, and the two-part system which makes an inclusive charge for the service and then a charge for the commodity. There are many people in the Gas Industry who think we might follow that example with advantage. Provided the small consumer is protected, a good deal is to be said for it, but personally it seems to me that some system by which a special discount is given to run with the quantity—*i.e.*, the larger the quantity the cheaper the price—avoids entering into the complications of dividing the charge into two parts. It is a matter we have had under consideration, not only here but elsewhere, for some considerable time. We have nothing definite to propose at the moment, however. If we have profits which we can afford to give away I do suggest that we ought very carefully to think whether that ought not to be done by a method of discount relative to the amount of consumption.

There is one other matter I should like to say a word or two about. We are always anxious to encourage our workpeople and officers and servants in all the work which they do, and we do something in training men and officials in the undertaking, and, indeed, in the Industry generally. I am also very happy to be able to say what I have said on other occasions, that our officers report on their subordinates and men as having carried out their duties thoroughly and efficiently during the past year, and I have no doubt that you will be pleased, with the Board, to have the opportunity of expressing your appreciation of that fact later on.

Dividend.

What we propose, as you will have seen, is that after putting £10,000 to the pension fund and £10,000 to the renewal fund, as we did a year ago, we shall pay the same dividend as last year, and carry forward about £3294 more than we brought into the account. Considering the difficulties of the times and matters generally, I think that is a result of which we are entitled to be proud, and which we have every satisfaction in reporting to you. I also should have said one other word in connection with the staff and workpeople, and that is that we continue to appreciate and fully to realize the advantage of the Co-Partnership Committee, who are earnest and loyal to their co-workers. They bring matters before us which they think ought to be brought forward and which we endeavour to deal with, and it is all done in that spirit of loyalty and service which runs through the Company from top to bottom.

I do not think there is anything else I desire to say to you except to thank you for listening to me, and I will therefore conclude by moving the following resolution:

> That the Report of the Directors and the Statement of Accounts for the year ended Dec. 31, 1931, showing a balance of £90,165 16s. 2d. available for dividends be, and the same are hereby received and adopted.

In answer to a question as to the manner in which the reserve fund is invested, the Chairman said that it was all invested outside the undertaking and mostly in Government loans and Corporation mortgages. There was also some railway stock, but it was guaranteed stock and not ordinary stock.

The resolution was carried unanimously.

The Chairman then moved the following resolution:

> That dividends at the following rates per annum for the half-year ended Dec. 31, 1931—namely, 7½ p.ct. on the £120,000 redeemable preference stock; 5 p.ct. on £469,590 maximum dividend stock; and 7 p.ct. on £807,560 sliding-scale stock, making with the interim dividends declared by the Directors and paid Sept. 1, 1931, dividends for the year at the respective rates of 7½, 5, and 7 p.ct., be now declared and payable on March 1, 1932.

Mr. Henry Woodall, who seconded the resolution, said he spent a great deal of time in visiting gas-works throughout the country, and could say that it was very rarely indeed that he saw a works that could give any point to the Croydon Gas Company's Works at Waddon. The Company was well served in every direction. Being an engineer, he took special interest in the works, and could assure the shareholders that they were excellently designed and maintained in every way. The carbonizing results were excellent, and they reflected the greatest credit on the Chief Engineer, Mr. Grogono.

The resolution was carried unanimously.

Mr. Thos. Rigby and Mr. Henry Woodall were unanimously re-elected to the Board.

Mr. Frederick S. Sloman was unanimously re-elected Auditor.

Votes of Thanks.

The Chairman, in proposing a vote of thanks to the staff, again emphasized the valuable services rendered by the officers and staff, and assured them that the Board and the shareholders thoroughly appreciated their efforts during the year.

Mr. Martin (a shareholder) seconded the resolution, which was carried with acclamation.

Mr. Sandeman (General Manager), acknowledging the vote of thanks, said the officials and staff really appreciated the vote of thanks which was annually accorded to them, because, being human, they liked to be told that the work they were doing was giving satisfaction. The past year had been an exceptional one; every Department of the Company had been very fully occupied, but thanks to the excellent team spirit which existed everything had gone along with great smoothness. As to the future, the strength of the business was in the fact that the Company was out to give service to the consumer; and while this was so, nothing could prevent the business from continuing its prosperous career.

Lord Rochester, in moving a vote of thanks to the Directors, said that the proprietors thoroughly appreciated the work of the Board throughout the year. In the midst of a busy life it did not fall to his lot to attend many company meetings. He only attended two during the year. One was that of the Midland Bank, to hear Mr. McKenna, and the other was that of the Croydon Gas Company, to hear their Chairman. He thought that the authoritative and exhaustive speech they had heard from the chair that day justified the proprietors in sparing the time to attend the annual meeting. If there were any people left who looked upon gas as a decaying industry they had only to look at the report to disabuse their minds of any such thought. The Directors were exceedingly conservative in matters of finance or they would not have been able to report that the securities in which the reserve fund and insurance fund were invested were to be found in the balance-sheet at less than their quoted market value. That said a great deal for the sagacity and care of the Board, in face of such depression as at present prevailed.

Mr. Barham seconded the resolution, and the Chairman having briefly responded the proceedings terminated.

Gas Companies' Results in 1931

Bury St. Edmund's.

The Annual Meeting of the Bury St. Edmund's Gas Company was held on Friday, Feb. 12, when Mr. J. Ridley Hooper (Chairman of the Directors) presided. The Directors' report for the year stated that the balance at credit of the profit and loss account (net revenue) amounted to £3939 after payment of an interim dividend of 3 p.ct. (less tax), and the Directors now recommended payment of a final dividend of 3 p.ct. (less tax) in respect of the past year which would absorb £1100, carrying forward the sum of £2839. Moving the adoption of the accounts, the Chairman said that although there had been no sensational advances, the general business of the Company had been well maintained during the year. The Company had supplied 83½ million c.ft. of gas. They showed an increased income from residuals of £600, in spite of loss on the sale of sulphate of ammonia. There was an increase in customers of 135, having now on their books a total of 3212. During the year, they sold 252 cookers, 242 gas fires, heaters, &c. After paying 6 p.ct. dividend for the year, they carried forward £2839, and they had a total reserve of over £12,000.

Cardiff.

The Annual Ordinary Meeting of the Cardiff Gas Light and Coke Company was held on Feb. 11, the Chairman of Directors (Mr. L. G. Williams) presiding. The Chairman, in submitting the Directors' report and annual statement of accounts, referred to the redemption of debenture stock which had been effected during the year. The stock had been replaced by 5 p.ct. redeemable debenture stock, which was issued at par. While the gross coal bill was larger in 1931 than in 1930, that had been more than counteracted by the revenue from residual products, in spite of unnecessary expense in which the Company was involved as a result of the coal dispute in January of last year. The year under review had not provided ideal conditions for sellers of heat units, and the exceptional weather conditions had combined with the persistent industrial depression in making the period an unsatisfactory one for the sales of gas, which showed a slight reduction upon the previous year. A large number of new gas-consuming appliances had been sold, and as improved efficiency resulted in the use of those that factor was not without its effect upon the total quantity of gas needed by consumers. There was an increase of 1112 in the total number of consumers in the year. To the co-partner employees the Chairman announced the provision of the same bonus amount for the year 1931 as was allocated for 1930. Dividends were then declared at the rate of 6 p.ct. per annum on the ordinary stock, and 4½ p.ct. per annum on the preference stock, subject to payment of interim dividends.

Newport (Mon.).

The Chairman of the Directors, Mr. George Geen, J.P., presided at the Annual Meeting of the Newport (Mon.) Gas Company at the Company's Offices, Mill Street, Newport. The Chairman said: Your Directors, under the conviction that the circumstances of the times called for every possible retrenchment, substantially reduced their fees during the year. Later in the year there were also reductions in the remuneration of the salaried staff, and from Jan. 1 of the present year a reduction in the wages of manual workers took effect under the terms of a national agreement negotiated by the Joint Industrial Council of the Industry. Further, with the co-operation of the official staff, your Directors instituted a general re-organization of the various Departments of the undertaking which has resulted in considerable economies having been effected. These measures account for the relatively improved financial position indicated by the accounts for the year ended Dec. 31 last. The profit for the year is sufficient to meet the usual dividend and interest charges, to set aside a necessary reserve for income-tax liability, to write off customary current depreciation from capital expenditure on meters and stoves, and to contribute a further sum of £3400 towards depreciation on such expenditure incurred prior to 1922. As it was not possible to do anything on this last account in 1930, any similar contribution had then to be postponed. After satisfying the charges enumerated, £612 is carried forward to next account. The debit balance on the capital account has now been reduced to £34,631, which is £22,830 less than it was ten years ago. Mr. T. Spittle moved that a final dividend at the statutory rate of 5 p.ct. per annum on the consolidated stock of the Company be declared for the half-year ended Dec. 31, 1931, and this was seconded by Mr. R. Wilson Bartlett and carried.

Portsmouth.

Presiding over the Annual Meeting of the Portsmouth Gas Company on Feb. 11, Mr. T. H. F. Lapthorn, J.P., Chairman of Directors, stated that the total sale of gas during 1931 had established another record in the history of the Company, having gone up by 54½ million c.ft., or expressed in percentage terms a little over 2 p.ct. beyond that of 1930. The appliances on hire had increased by 3746, and the number of customers by 1801, the latter now totalling 69,788. Dealing with the accounts, Mr. Lapthorn said the only item in the capital account calling for comment was the figure of £12,445 spent on new mains. That showed an increase of £7500, and was part of the cost of the new 15-in. main which the Company had laid down from Havant to Emsworth. The work had given employment to between 45 and 50 men for five months, and the balance of the cost, approximately £3000, would be charged in this year's accounts. On the revenue account, the receipts from the sale of gas were up by £7713, but the coke receipts were down by £2528. They had made less coke and sold less, but the price had been 1s. 11d. per ton over the average price realized in 1930.

For some time they had felt the need of periodical examination and overhaul of service pipes and consumers' appliances and internal fittings. This work had been started during the year, and when the present survey had been completed they intended to inspect the whole of their apparatus out in the district twice a year. The Chairman concluded by referring to the retirement, after 44 years' service, of Mr. E. T. Stewart, and also made special mention of the fact that one of the staff, Mr. A. J. Garward, won the Goodenough Gold Medal during the year for a paper on "Holding and Creating Business." The report and accounts were adopted, and a dividend of 5 p.ct. on the 5 p.ct. maximum stock and of 8 p.ct. on the consolidated stock, both less income-tax, was approved.

Parliamentary Intelligence

[From Our Special Correspondents.]

House of Lords.

Private Bills.

The Gas Light and Coke Company's Bill and the South Metropolitan Gas Bill have been read a first time and referred to the Examiners of Private Bills, by whom they will be considered on Feb. 16. Petitions have been presented against the Gas Light and Coke Company's Bill by Messrs. Sherwood & Co. on behalf of the Essex County Council and the Port of London Authority; by Messrs. Lewin, Gregory, & Co. on behalf of the Canvey Island Commissioners and the Essex Rivers Catchment Board; and by Messrs. Neve, Beck, & Crane and Messrs. Engall & Crane on behalf of the Canvey Island Urban District Council. Petitions have been presented against the South Metropolitan Gas Bill by Messrs. Blyth, Dutton, & Co. on behalf of the Society of British Gas Industries; and by Messrs. Sharpe, Pritchard, & Co. on behalf of the South Eastern Tar Distillers, Ltd.

Petitions have also been presented by Messrs. Rees & Freres on behalf of the Sheffield Gas Company against the Rotherham Extension Bill; and by Messrs. Dyson, Bell, & Co. on behalf of the Gas Light and Coke Company against the Port of London (Various Powers) Bill.

House of Commons.

Private Bills.

The Second Reading of the Commercial Gas Bill has been deferred to Feb. 19. A motion for its rejection has been put down by Mr. George Hicks, M.P. for East Woolwich.

The South Suburban Gas Bill and the Oakham Gas and Electricity Bill have been read a second time and referred to the Examiners.

The Kettering Gas Bill, which has met with considerable objection in the House, has been put down for Second Reading to-day, but it will almost certainly be further postponed until time can be given for a debate on it.

The Mid-Southern Utility Bill and the Scarborough Gas Bill have been read a second time and referred to the Examiners.

Smokeless Fuel.

Mr. John asked the First Commissioner of Works the reason for the use of "Coalite" in the Palace of Westminster; and whether its use helped any of the refining industries associated with the coal trade.

Mr. Ormsby-Gore stated in reply that "Metro Coalite" was used in accordance with a decision of the late Government to encourage the use of low-temperature carbonization smokeless fuel by using it in Government buildings when obtainable at a price comparable, value for value, with the price of coal. Whether its use helped any of the refining industries associated with the coal trade was a matter on which he had no very definite information.

European Gas Company.

Proportion of British Holders.

An extraordinary meeting of the European Gas Company is to be held on March 8, at the Great Eastern Hotel, E.C. 2, at 12.30 p.m., to consider a resolution that the articles of association be amended by the insertion of an additional article, the effect of which will be to fix the proportion of stock held by British holders at not less than 80 p.ct. of the total capital. Share warrants to bearer will be regarded for this purpose as not held by British holders.

At present the proportion of registered stock held by British holders is 87 p.ct.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

Markets opened quietly on the Stock Exchange last week, and the volume of business was on a small scale. International affairs continued the dominating factor and any fresh developments caused prices to fluctuate. It was not surprising, therefore, that the rumours of a favourable Anglo-French agreement on the Reparations problem brought about a marked improvement towards the close, and the Account finished up under distinctly more favourable conditions; in fact, it was generally considered that more business was transacted on Saturday last than on any Saturday since the resumption of opening last year for this half day.

The volume of business in the Gas Market was heavier while prices continued to harden, particularly those of the larger undertakings, and Gas Light and Newcastle £1 units and South Metropolitan ordinary all showed improvement. At the time of writing, the prices of these stocks and many other ordinary denominations contain a full half-year's dividend. A sharp rise of 13½ points was made by South Shields consolidated stock on the publication of the report and accounts, which show that the dividend for the past year, despite the adverse trade conditions on the Company's district, has been maintained at 8½ p.ct. On this basis the yield on the current price of 122½ is nearly 7 p.ct., so that some improvement in price was somewhat overdue. Croydon maximum stock and Liverpool 5 p.ct. (at Liverpool) were marked up, while several debenture issues also rose in value.

Among the dividend announcements made last week were the following:

—	First Half.	Second Half.	Year 1931.	Year 1930.
	P.Ct.	P.Ct.	P.Ct.	P.Ct.
East Surrey . . .	2½	2½	5	5
Derby	3½	5	8½	8½
European	2	3½	5½*	5½*
Northampton . . .	2½	2½	5	5
Sheffield	3	3	6	6½
South Shields Consolidated and New	4½	4½	8½	8½
Wandsworth . . .	3½	3½	7	7

* Free of tax.

Current Sales of Gas Products.

The London Market for Tar and Tar Products.

LONDON, *Feb.* 15.

There is little or no change in the values of tar products, which are as follows:

Pitch is firm at 85s. per ton f.o.b.

Creosote, for export, varies from 3¾d. to 5d. per gallon f.o.b., according to specification.

Pure toluole is about 2s. 9d. per gallon at makers' works; pure benzole, 1s. 8d. to 1s. 9d. per gallon; and 95/160 solvent naphtha, about 1s. 5d. per gallon; and pyridine bases, 90/140, about 3s. 9d. to 4s. per gallon.

Tar Products in the Provinces.

Feb. 15.

The average prices of gas-works products during the week were: Gas-works tar, 36s. to 41s. Pitch—East Coast, 75s. to 80s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 75s. to 80s. f.o.b.* Toluole, naked, North, 1s. 10½d. to 1s. 11d. Coal-tar crude naphtha, in bulk, North, 5d. to 5¼d. Solvent naphtha, naked, North, 1s. 3d. to 1s. 3½d. Heavy naphtha, North, 11d. to 11½d. Creosote, *ex* works, in bulk, North, liquid and salty, 3½d. to 3¾d.; low gravity, 1¼d.; Scotland, 3½d. to 3¾d. Heavy oils, in bulk, North, 5d. to 5½d. Carbolic acid, 60's, 1s. 7½d. to 1s. 8d. Naphthalene, £9 to £10. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Feb.* 13.

Only a moderate volume of business has been transacted during the week, but quotations for most products remain steady.

Pitch.—Supplies continue short with export value nominal at 75s. to 77s. 6d. per ton f.o.b. Glasgow. Home orders now command 77s. 6d. to 80s. per ton *ex* works in bulk.

Refined tar to Ministry of Transport Specification is firm at 4d. to 4½d. per gallon *ex* makers' works in buyers' packages; there being lower stocks on hand than usual at this time of the year.

Creosote oil.—Supplies are not too plentiful, and quotations are steady. B.E.S.A. Specification is 3d. to 3¼d. per gallon; low gravity, 3¼d. to 3¾d. per gallon; and neutral oil, 3¾d. to 3¾d. per gallon—all *ex* works in bulk.

Cresylic.—Few orders are being received and prices are irregular. Pale, 97/99 p.ct. is 1s. 1½d. to 1s. 2½d. per gallon; dark, 97/99 p.ct., 1s. 0½d. to 1s. 1½d. per gallon; and pale, 99/100 p.ct., 1s. 3½d. to 1s. 4d. per gallon—all *ex* works.

Crude naphtha.—Value is maintained at 4½d. to 5d. per gallon f.o.r. in bulk, according to grade.

Solvent naphtha.—The market is dull, with quotations easy; 90/160 grade being 1s. 3d. to 1s. 4d. per gallon, and 90/190 grade 1s. to 1s. 1d. per gallon.

Motor benzole.—The local demand is moderate at 1s. 3d. to 1s. 4d. per gallon f.o.r. in buyers' tanks.

Pyridines.—90/160 grade is 3s. to 3s. 3d. per gallon, and 90/140 grade 3s. 3d. to 3s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	7	to	0	7½	per gallon at works
Motor "	1	2	"	1	3	" " "
Pure "	1	6	"	1	7	" " "

Contracts Advertised To-Day.

Gas Heater.

The Warrington Gas Committee invite tenders for the supply of a gas heater. [Advert. on p. 390.]

Meters.

The Milford Haven Urban District Council invite tenders for the supply of gas meters. [Advert. on p. 390.]

The Manchester Corporation Gas Committee invite tenders for the supply and repair of meters. [Advert. on p. 390.]

Oxide (New and Spent).

The Manchester Corporation Gas Committee invite tenders for new and spent oxide. [Advert. on p. 390.]

Oxide of Iron, Sulphuric Acid.

The Halifax Gas Committee invite tenders for the supply of oxide of iron and sulphuric acid. [Advert. on p. 390.]

Pipes, Fittings, &c.

The Halifax Gas Committee invite tenders for the supply of cast and wrought iron pipes, specials, and fittings. [Advert. on p. 390.]

Stores, Paints, Cement, Gunmetal Cocks, Ironmongery, &c.

The Halifax Gas Committee invite tenders for the supply of various stores, tools, &c. [Advert. on p. 390.]

Tar Extractor.

The Warrington Gas Committee invite tenders for the supply of a tar extractor. [Advert. on p. 390.]

Washer.

The Warrington Gas Committee invite tenders for the supply of a Livesey washer. [Advert. on p. 390.]

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Feb. 13. (Provincial Exchanges Feb. 12.)	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
1,551,868	Stk.	Oct. 5	7⅞	7⅞	Alliance & Dublin Ord. ...	103—108	...	105½—106
374,000	„	Jan. 4	4	4	Do. 4 p.c. Deb.	65—70	...	...
522,655	„	Aug. 24	7	7	Barnet Ord. 7 p.c. ...	120—125	...	...
300,000	1	Oct. 19	1/9⅜	1/4¼	Bombay, Ltd. ...	15/—17/6	...	...
174,500	10	Aug. 10	9	9	Bournemouth 5 p.c.	14⅝—15⅝	...	15½—15½
500,050	10	„	7	7	Do. B 7 p.c.	12—13	...	...
439,160	10	„	6	6	Do. Pref. 6 p.c. ...	10½—11½	...	...
50,000	Stk.	Dec. 14	3	3	Do. 3 p.c. Deb. ...	53—58	...	...
162,025	„	„	4	4	Do. 4 p.c. Deb. ...	73—78	...	...
210,000	„	„	5	5	Do. 5 p.c. Deb. ...	92—97	...	...
357,900	„	Aug. 24	7½	7½	Brighton & Hove 6 p.c. Con.	114—119	...	...
371,880	„	„	6⅔	6⅔	Do. 5 p.c. Con.	104—107	...	105—107
1,287,500	„	July 23	5	5	Bristol 5 p.c. max.	90—92ª	...	...
120,420	„	Jan. 4	4	4	Do. 1st 4 p.c. Deb. ...	77—79ª	...	...
217,870	„	„	4	4	Do. 2nd 4 p.c. Deb. ...	77—79ª	...	...
328,790	„	„	5	5	Do. 5 p.c. Deb.	97—98ª	...	...
855,000	„	Oct. 5	8	7	British Ord.	108—113	...	109½—111
100,000	„	Jan. 4	7	7	Do. 7 p.c. Pref.	108—113	...	...
120,000	„	„	4	4	Do. 4 p.c. Red. Deb. ...	70—75	...	73
450,000	„	„	5	5	Do. 5 p.c. Red. Deb. ...	90—95	...	...
160,000	„	Jan. 4	5	5	Cambridge 5 p.c. Deb. ...	90—95	...	...
100,000	10	Nov. 30	8	6	Cape Town, Ltd.	8⅝—9⅛	...	...
100,000	10	Oct. 30	4½	4½	Do. 4½ p.c. Pref. ...	6½—7½	...	...
150,000	Stk.	Jan. 4	4½	4½	Do. 4½ p.c. Deb. ...	65—70	...	...
626,860	„	July 23	6	6	Cardiff Con. Ord.	95—98	...	...
237,860	„	Jan. 4	2½	5	Do. 5 p.c. Red. Deb.	91—96	...	...
157,150	„	Aug. 10	6½	5	Chester 5 p.c. Ord.	87—92ª	...	...
98,936	1	Oct. 5	1/2/-	2/-	Colombo, Ltd. Ord.... ...	27/—32/-	...	...
24,500	1	„	1/4¼	1/4¼	Do. 7 p.c. Pref.	17/—19/-	...	...
609,204	1	Oct. 19	1/3'27	/10'90	Colonial Gas Assn. Ltd. Ord.	10/—15/-	...	...
296,053	1	„	1/5'67	1/2'54	Do. 8 p.c. Pref.	10/—15/-	...	...
2,073,280	Stk.	July 23	6	6	Commercial Ord.	93—96	...	94½—95
475,000	„	Dec. 14	3	3	Do. 3 p.c. Deb. ...	51—56	...	...
807,560	„	Aug. 10	7	7	Croydon sliding scale ...	107—110	...	...
469,590	„	„	5	5	Do. max. div.	82—85	+1	84—84½
542,270	„	Aug. 24	10	7	Derby Con.	120—125ᶜ	...	...
55,000	„	Jan. 4	4	4	Do. Deb.	65—70ᶜ	...	...
209,000	„	Sept. 7	5	5	East Hull Ord. 5 p.c. ...	71—76	...	75½—76
179,500	„	Aug. 24	5½	5½	East Surrey Ord. 5 p.c. ...	86—91	...	...
155,019	„	Jan. 4	5	5	Do. 5 p.c. Deb. ...	90—95	...	...
1,002,180	„	Sept. 21	16½	14	European, Ltd.	103—113	...	104—106
18,911,198	„	July 23	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	18/9—19/9/	+/3	18/7½—19/9
2,600,000	„	„	3½	3½	Do. 3½ p.c. max. ...	54—59	...	57½—58
4,294,691	„	„	4	4	Do. 4 p.c. Con. Pref. ...	73—78	+1	75—76
6,102,497	„	Dec. 14	3	3	Do. 3 p.c. Con. Deb. ...	56—61	+1	58—60
3,642,770	„	„	5	5	Do. 5 p.c. Red. Deb. ...	94—99	+1	97—99
2,500,000	„	„	4½	4½	Do. 4½ p.c. Red. Deb. ...	85—90	...	...
161,480	„	Sept. 7	10	10	Harrogate Cons. 10 p.c. max.	157—162	...	...
82,500	„	Aug. 24	7	7	Hastings & St. L. 5 p.c. Conv.	95—100	...	...
258,740	„	„	5½	5½	Do. 3½ p.c. Conv.	81—86	...	...
70,000	10	9 Oct. '30	½	10	Hongkong & China, Ltd. ...	11—12	...	...
213,200	Stk.	Aug. 10	6	6	Hornsey Con. 3½ p.c. ...	89—92	...	90½—91½
2,800,000	„	Oct. 30	25	15	Imperial Continental Cap.	320—340	...	326—333
223,130	„	Feb. 1	3½	3½	Do. 3½ p.c. Red. Deb.	68—73ᶜ	...	...
235,242	„	Aug. 10	8½	8½	Lea Bridge 5 p.c. Ord. ...	129—132	...	...
2,145,907	„	Aug. 24	6	6	Liverpool 5 p.c. Ord. ...	97½—98⅛	+⅜	...
245,500	„	—	—	5	Do. 5 p.c. Red. Pref. ...	94—99ᵇ	...	...
306,083	„	Jan. 15	4	4	Do. 4 p.c. Deb. ...	78—80ᵇ	...	...
165,786	„	Aug. 24	9	8	Maidstone 5 p.c. Cap. ...	123—128	...	...
56,176	„	Jan. 4	3	3	Do. 3 p.c. Deb. ...	51—56	...	...
75,000	5	Nov. 30	110	110	Malta & Mediterranean ...	6½—7	...	...
392,000	—	Oct. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	78—83	...	...
171,978	Stk.	Aug. 24	5	5	M. S. D. Utility "C." Cons.	76—81	...	78—79
718,657	„	„	4	4	Do. 4 p.c. Cons. Pref.	67—72	...	70—71
112,126	„	£	4	4	Do. 4 p.c. Deb. ...	70—75	...	72—72½
148,955	„	£	5	5	Do. 5 p.c. Deb. ...	90—95	...	...
675,000	„	May 21	16	16	Montevideo, Ltd.	70—80	...	...
2,061,315	„	Aug. 10	5⅔	5	Newcastle & Gateshead Con.	16/6—17/6ᵈ/	+/6	...
682,856	„	„	4	4	Do. 4 p.c. Pref. ...	67—69ᵈ	...	...
691,705	„	Jan. 4	3½	3½	Do. 3½ p.c. Deb. ...	68—70ᵈ	...	...
277,285	„	Oct. 30	5	5	Do. 5 p.c. Red. Deb.	96—98ᵈ	...	...
199,940	„	Aug. 24	7½	7½	North Middlesex 6 p.c. Con.	105—110	...	...
396,160	„	Aug. 10	5	5	Northampton 5 p.c. max. ...	74—79	...	...
300,000	„	Nov. 30	7	9	Oriental, Ltd.	88—98	...	...
60,000	5	13 May, '15	—	—	Ottoman	0—¼	...	...
205,162	Stk.	Jan. 4	8	8	Plym'th & Stonehouse 5 p.c.	114—119	...	...
504,416	„	Aug. 24	8	8	Portsm'th Con. Stk. 4 p.c. Std.	119—124	...	120—122
241,446	„	„	5	5	Do. 5 p.c. max. ...	76—79	...	76½—77½
686,312	„	Jan. 18	4	4	Primitiva 4 p.c. Rd. Db. 1911	75—85	...	...
389,813	„	Jan. 4	4	4	Do. 4 p.c. Cons. Deb.	75—85	...	...
150,000	10	Sept. 21	6	6	San Paulo 6 p.c. Pref. ...	7¼—7⅝	−¼	7⅜—7½
1,736,968	Stk.	Sept. 7	6⅔	6	Sheffield Cons.	103—105ᵉ	...	...
95,000	„	Jan. 18	4	4	Do. 4 p.c. Deb.	79—81ᵉ	...	...
133,201	„	Sept. 7	5	8½	Shrewsbury 5 p.c. Ord. ...	90—95	...	...
90,000	10	June 11	15	15	South African	3½—5½	...	...
6,709,895	Stk.	July 23	7⅛	8	South Met. Ord.	97—100	+1½	97½—100
1,155,812	„	„	6	6	Do. 6 p.c. Irred. Pf.	103—108	...	105
1,895,445	„	Jan. 4	3	3	Do. 3 p.c. Deb. ...	55—60	...	57½—58½
1,000,000	„	Jan. 18	4	5	Do. 5 p.c. Red. Deb.	93—98	...	97—102
91,500	„	Aug. 10	8½	8½	South Shields Con.	120—125ᵈ	+13½	...
1,543,795	„	Aug. 10	6¾	6¾	South Suburban Ord. 5 p.c.	100—105	−1	101—103¾
668,887	„	Jan. 4	5	5	Do. 5 p.c. Deb.	91—96	+1	...
647,740	„	Aug. 24	5	5	Southampt'n Ord. 5 p.c. max.	77—80	...	...
121,275	„	Jan. 4	4	4	Do. 4 p.c. Deb.	70—75	...	...
250,000	„	Aug. 24	7	7	Swansea 7 p.c. Red. Pref. ...	96—99	...	...
200,000	„	Jan. 4	6½	6½	Do. 6½ p.c. Red. Deb.	98—101	...	...
1,076,490	„	Aug. 10	6⅔	6⅔	Tottenham and District Ord.	103—107	...	...
300,000	„	„	5⅔	5⅔	Do. 5⅔ p.c. Pref. ...	93—98	...	...
199,005	„	Dec. 14	4	4	Do. 4 p.c. Deb. ...	71—76	...	...
85,701	„	Sept. 21	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	72—77	...	...
346,069	„	Aug. 24	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	102—107	...	...
88,330	„	„	5	5	Do. 5 p.c. Pref. ...	85—90	...	...
1,322,220	„	July 9	7	7	Wandsworth and District: Consolidated	110—114	...	...
971,373	„	„	5	5	Do. 5 p.c. Pref.	90—95	...	91½—94
1,167,964	„	Jan. 4	5	5	Do. 5 p.c. Deb.	92—97	...	93—94½

Quotations at :—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g* The interest due 1/1/32 was paid on that date. ª Ex. div. † Paid free of income-tax. ‡ For year. § Div. =10 p.ct. p.a. less tax and less tax on interim dividend.

(This announcement is inserted gratuitously.)

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With one exception Peter is an ordinary little fellow. Chubby, likeable, just five-and-a-half, full of life and fun and on occasions—be it admitted—of naughtiness.

Just now Peter's rather important, for this is his first term at school, and he's grappling with the intricacies of "A B C" and "Twice Two": difficult subjects to all men of five-and-a-half, but even more difficult in Peter's case because—bad luck—he's totally blind. That's his One Exception.

Peter learns reading, writing, and 'rithmetic through the medium of "Braille"—dull stuff compared with the coloured picture books of most five-and-a-halfs. However, he's a stout lad is Peter, and he's making great progress.

Would you like to know more about him? How, in spite of his "One Exception," he is being educated, and, when older, technically trained and usefully employed.

There is a long waiting list of "Peters" throughout the British Isles, for whom training and accommodation must be provided in the immediate future.

Will you help with a donation or annual subscription? Any sum, large or small, will be gratefully received.

Here's a suggestion. Your eyesight is worth 3d. a year to you. Send Peter and his handicapped pals 3d. for every year you've had it. Now, please, in case it slips your memory. Good idea!

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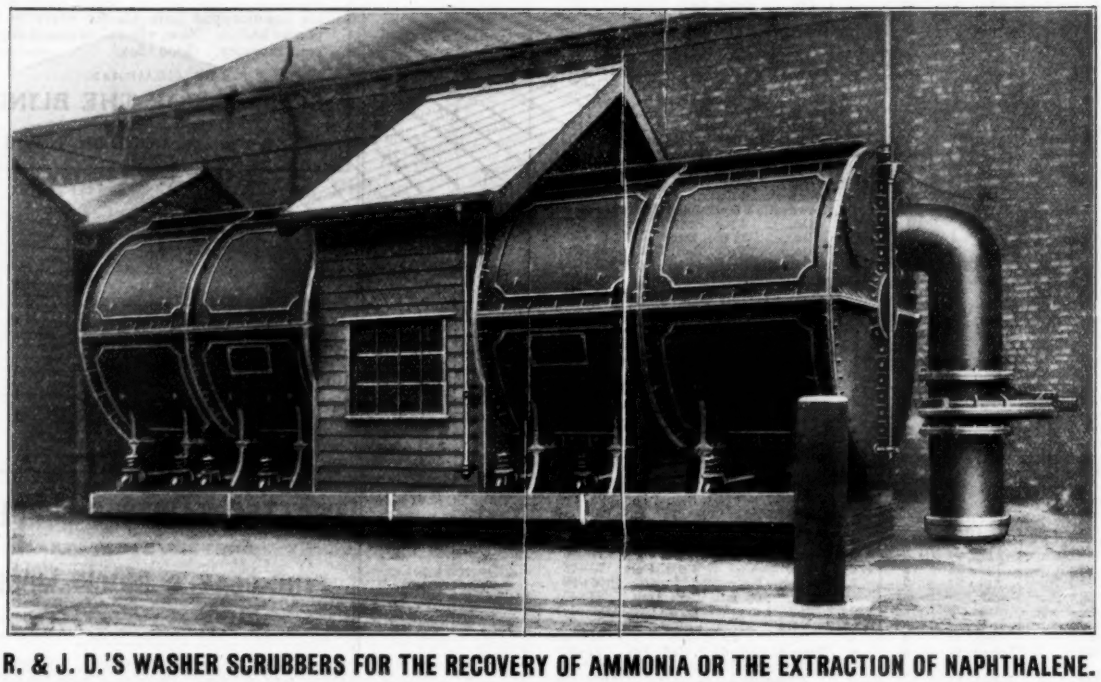

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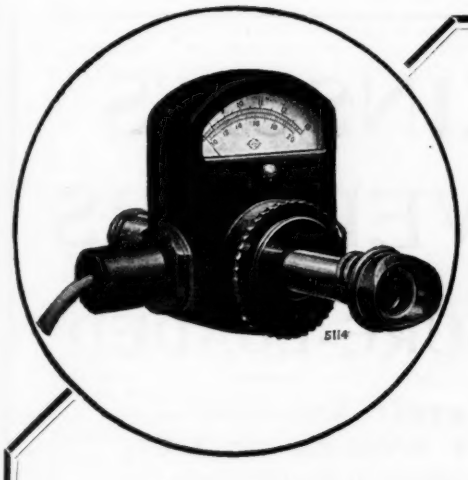

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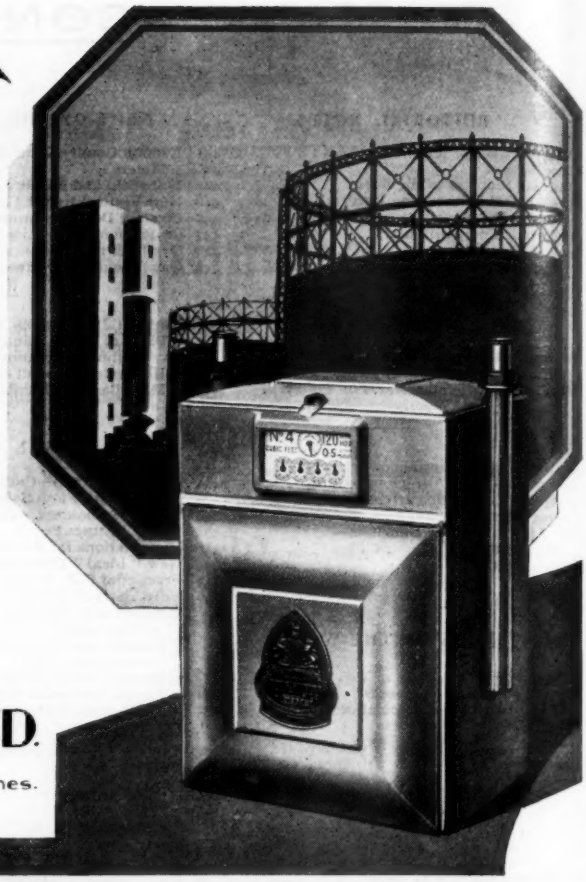

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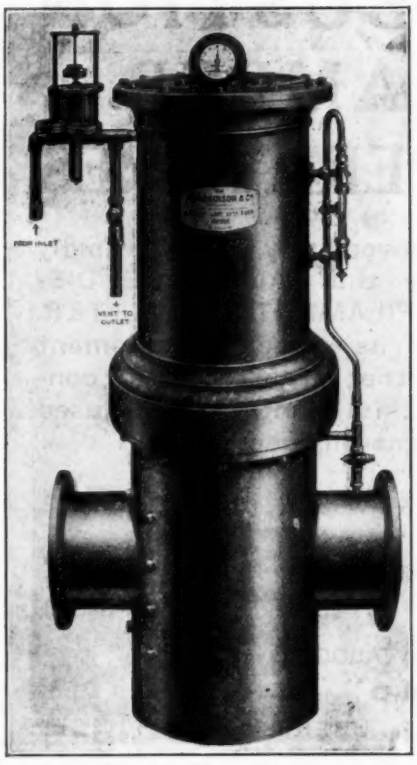

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